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Battelle Technical Review

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Design Methods for Today's Needs

ADVISOR ON CHEMICAL PROBLEMS

RAY E. HEIKS

Two heads are better than one, and in research, a team of experts can be expected to be most highly effective in solving both typical and special problems. Convinced of the value of team research, Ray E. Heiks points out that the massive accumulation of technical information tends to create technologists who are highly specialized. On narrow problems, individual specialists are capable of amazing accomplishments. But today, our technical problems are becoming more complicated because they cut across many areas of technology. Most investigations, therefore, benefit from a cooperative attack which embodies a selected and coordinated concentration of special proficiencies.

Ray has had numerous opportunities, since joining Battelle as a research chemist in 1942, to see the value of team research demonstrated. He has participated in and directed an impressive variety of investigations. These have included studies of the use of copper as an additive in antifouling paints and wood preservatives; selenium chemistry; preservatives for wood and fabrics; lubricants, including development of pressure additives, antioxidants, synthetics, and lubricants for die casting; creosotes; and development of a gamma source camera for inspection of wood piling.

As an outgrowth of his work with selenium, Ray turned to studies of selenium, tellurium, and other semiconductor compounds, such as germanium, silicon, and intermetallics. Another by-product of his activities was the establishment of Battelle's research station at Daytona Beach, Florida, for the study of wood preservation, paints, corrosion, and general deterioration problems.

Currently, Ray serves as a technical advisor. In this work he advises sponsors of research in the Battelle laboratories on the formation of their chemical research programs.

Before his association with Battelle, Ray received his M.S. in analytical chemistry and Ph.D. in physical chemistry from The Ohio State University. He had also served on the faculty at Marshall College.

Along with his technical and administrative responsibilities, Ray has been author of more than a dozen articles. He is also an active member of the American Chemical Society, the American Wood Preservers Association, and Sea Horse Institute.

At home, Ray's family, including four younger Heiks, who range in age from 14 to less than one year, leave him little time to get in fishing and golf.

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Chroniclers of Technology

TRADE AND BUSINESS PUBLICATIONS are such a normal part of our commercial life that rarely does one give thought to their technical-economic significance. Yet, they, like the scientific journals, are key cogs in our machinery for progress—mechanisms we could not do without.

The chief function of the trade or business journal is, of course, to inform. Through their news and feature pages, they keep their readers posted on what is happening in an area of industry, or in business generally. On these pages they present news, instructive articles, economic and technical data, and the reflected views and opinions of thought leaders in the sections of industry or commerce they serve. The advertising columns that support these publications—important also as sources of information—are the showcases of the products and services of interest to businessmen.

But trade and business publications do even more. They fill the gap in communications between the laboratory scientist and practical operating and management personnel. Edited as they are for those who put the results of research to work, they are important chroniclers of technology to productive people. They take over where the scientific journals leave off and interpret scientific advance to the people capable of, and interested in, applying it. Thus, they constitute a link between the laboratory and the shop through which industrial progress is transmitted.

From the management standpoint, one of the most important services provided by trade and business publications is their "boiling down" and organization of technical and economic information collected from diverse and widely scattered sources. A feature article in one of these journals may represent the gleanings from scores of separate research investigations or business experiences. The busy manager, in a brief reading, gets the refined essence from numerous reports. Quickly he can store in his mind data and information that will be useful to him when he is called upon to make decisions in the future.

The research man also gets valuable information and perspective from these publications. He learns what others are doing, gains a feeling for the problems of the industry, and is able to appraise his own work in light of what it means or could mean to those who will make practical use of it. The research scientist who reads the trade and business journals in his field keeps his feet on the ground and his aspirations realistic. Yet, these publications, calling as they do for action and progress, provide him an ever-flowing stream of challenging ideas.

One of the principal reasons for the present high rate of technological progress is the speed with which research results are applied. The interval between the laboratory and production has been cut to the barest minimum. There can be no doubt but that trade and business publications, by their factual, interpretative reporting have helped make this possible. To the chroniclers of technology, we thus owe much for the dynamicism of our present industrial economy.

Clyde Williams

President and Director, Battelle Memorial Institute

RUBBER MIXER

Natural rubber and the various synthetic rubbers must have compounding ingredients added to them to develop desirable characteristics. Each composition must also receive a different mixing treatment, depending upon the properties desired in the end product. This mill, in the Battelle rubber and plastics laboratories, can be adjusted to mix compositions properly. The speed of each of its rolls can be controlled individually, thus providing just the right amount of shear for specific mixing operations.

Linking of Machine Tools

Transfer mechanisms for linking machines are a most important aspect of automation in machine tools. Such mechanisms now are being applied to many manufactured products.

by ARTHUR SCHARF

AUTOMATION IS A WORD IN the machine-tool field that has finally caught up with the process which it names. For some 50 years, there has been the evolution from general-purpose machine tools such as lathes, milling machines, and drill presses to the fully automatic screw machine, the production miller and multi-spindle drills. In these single-purpose machines, the individual steps in a complex sequence of machining operations are controlled by the machine. Thus, after the initial setting of the controls, the principal function of the operator is that of bringing material to the machine and carrying it away.

It was inevitable that the next step would be the elimination of this relatively unproductive use of manpower to bring material and to carry away products. The first additions to the machines were improvised loaders which fed parts from a magazine and ejectors which fed the products to gravity-type, roller conveyors. The next stage was the linking of successive machines with synchronized conveyors. These assemblies of machines were called transfer machines because the principal novelty was the rather involved mechanism for transferring the work from one machine component to the next. The transfer step also involved an inspection step in order to be sure that each operation was properly accomplished before proceeding to the next.

Arthur Scharf has been active in many research activities in mechanical engineering since his association with Battelle in 1947. These activities include product development, development of manufacturing processes for etching glass with abrasives and cleaning of cotton, feasibility studies on new products and processes, and technical information studies in mechanical engineering. Earlier, while associated with the experimental towing tank facility at Stevens Institute of Technology, he helped in the design of equipment for testing ship models.

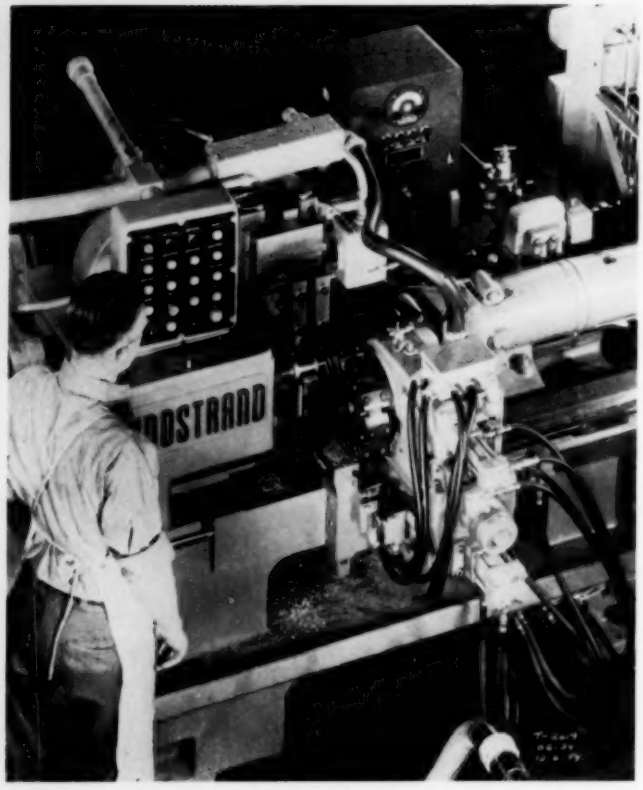
Automation in machine tools is a dramatization of the growth of transfer machines. Considerable technical development had taken place under the earlier designation and there were numerous installations. However, the postwar production scramble and the continuing labor shortage led to a marked increase in the number and complexity of these machines. This sudden expansion combined with the widespread acceptance of the rather magical term, automation, has caught public attention.

One may explain automation as the application to mechanical production of the flow-line methods that are typical of chemical engineering processes. As generally applied, manufacturing operations are transformed from batch to continuous. In some cases, there is a rigid linking of the series of machines so that there is a uniform progression of parts through the system. Occasionally, flexibility is built in by having a machine feed from a hopper and discharge into the hopper of the following machine.

The transfer machine provides additional functions beyond work handling. There is chip removal, for example, from deep holes. There are inspections made at different stages and on completion. In some cases, tooling is adjusted and replaced as needed. When the machine meets a problem which it cannot handle, an elaborate series of safety devices and interlocks shuts down the machine and calls for help.

FIELDS OF APPLICATION

The press forming of sheet metal parts is well suited to automatic production. Small parts have long been made on a progressive die which combines several



An automatic lathe for finishing electric motor rotors. Tools are automatically advanced as they wear and replaced when dull. (Courtesy of The Sundstrand Machine Tool Company)

stages of piercing, blanking, and forming. The availability of strip in long coils has led to feeders which, once started, will handle the entire coil. Recently very wide presses have permitted the use of the progressive die for large-part manufacture, several presses being gaged with automatic handling to advance the work from press to press.

There has been some work with heavy forgings. Some automotive crankshaft manufacture is mechanized from billet preparation, through heating, to closed die forging. Cold headers have long been automatic from wire coil to finished product, but increasingly complicated parts are being made with this process.

Drilling, reaming, boring, and tapering are probably the most common operations on machined parts. These operations have received the greatest application because the equipment for doing them is rather simple and easily controlled. For simple parts, multi-spindle drill presses have been widely employed. Often, however, the holes are so numerous or closely spaced, that successive operations are necessary. In other cases, a series of operations are required on a single hole; for example, drilling, spot facing, counter boring, and tapering. Where long holes are required, it is sometimes easier to consider them as a series of partial depth holes.

The usual arrangement for these machines is that of a series of stations clustered with drill heads. At the beginning and end of the series are means to transfer the work from previous operations and to succeeding ones. Between the stations is the conveying and inspection equipment. One of the largest of these machines is shown on page 83. It handles automobile engine blocks at the rate of 100 per hour and performs 555 operations and 133 inspections.

It is a comparatively minor step to include milling, facing, and slotting operations. Where the duration of cut is less than the transfer machine cycle time and access to the part is compatible to the transfer mechanism, these operations are included directly in the chain. In other cases, there may be a break in the chain for the insertion of a group of parallel slower machines.

Automatic Lathes

Lathe work is not usually combined in chains with other types of operations because the part is often completed in the single lathe set-up. In any case, it is usually simpler to complete the part by picking it up from a hopper, after cut off on the lathe.

Instead, the development of automatic lathes has gone in the direction of completely unattended operation. In addition to automatic loading and unloading, this requires automatic gaging and tool replacement. The illustration on this page shows a lathe of this type. Electric motor rotors are loaded, rough and finish turned, gaged, and unloaded. The tools are advanced into the work in response to demand from the gage to maintain constant diameter despite tool wear. After a maximum of tool advance, corresponding to a dull tool, the tool holder is indexed to bring a fresh pair of tools into position. Thus 5 to 8 hours of unattended operation is possible.

Another type of automatic lathe that has received development is magnetic tape controlled. The positions of the various control knobs are recorded on tape for different stages of machining. The recording is accomplished by having a machinist make the first part with the tape system recording. The playback of the tape causes a reproduction of the sequence of operations on subsequent parts. This method has also been accomplished with punched card control.

Operations Problems

Thus far, one of the limitations to the application of automation has been a reluctance to make the entire production of a plant dependent upon a linked group of machines. Production stoppages do occur when tool changes are necessary on transfer machines. However, when preset, reground tools are installed according to a counter-controlled panel board, it is possible to plan for normal tool wear and thus minimize expected "downtime". Abnormal tool wear caused by changes in materials and occasional tool breakage must be detected by automatic gaging equipment or by patrolling the machine to prevent loss of product quality or tolerance.

Many types of failures must be guarded against because of the absence of the human observer. For example, there is the possibility of the stoppage or deflection of the coolant supply. Dependable chip removal from the work and the machine is an obvious need because of its effect on subsequent operations. Automatic and reliable lubrication is necessary, as is continuous protection of the ways from the flow of chips. Lubricating oil filters and signals to warn against lube system failures are also required for dependable operation.

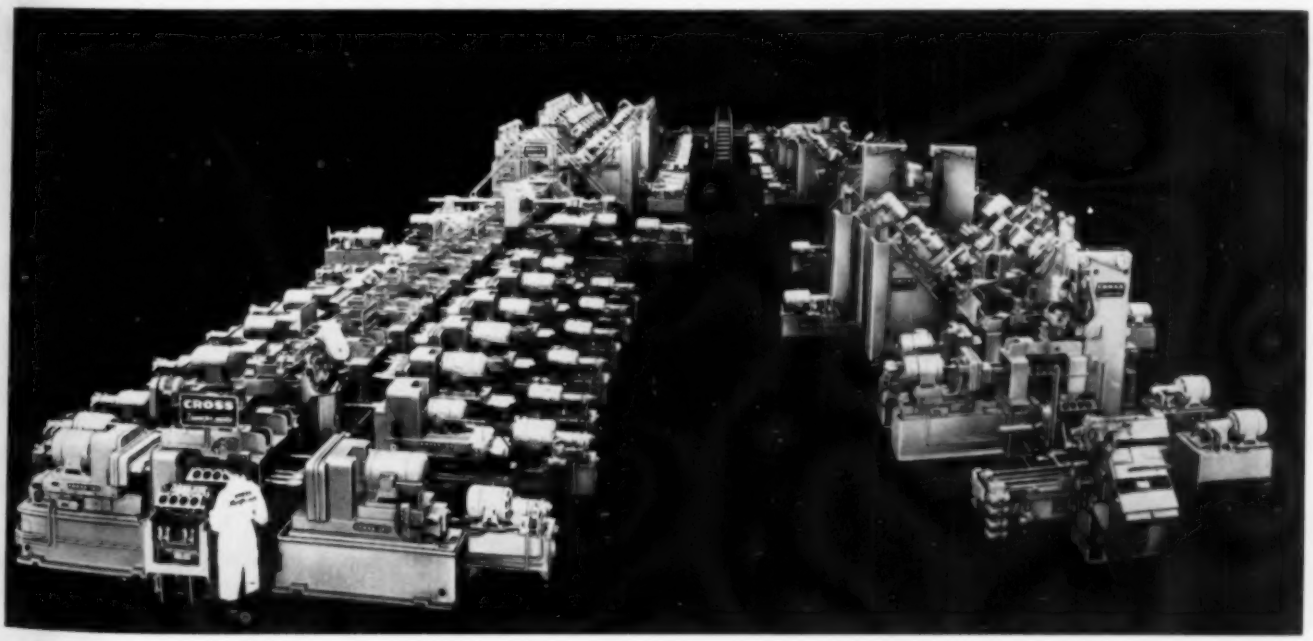
Hydraulic components present no greater problem in an automatic sequence than in a single machine, but where there are hundreds of pipe connections, leakage can be serious. It is common to mount the pump and control devices on the reservoir, near the section of the machine they service, with sufficient space provided for ready access and maintenance. The solenoid valves that interlock the hydraulic circuits with the master electrical controls are typical critical components.

It is also clear that when a machine, or more properly a section of a factory, incorporates as much as 100 miles of electrical wiring, the ready identification and quick repair of electrical components is vital. At large central checking panels, it is possible to study the operation of the major components. The circuits are grouped so that detailed checking is done only in the panel nearest to the failure. Elaborate safety systems must protect the repairmen against exposed high voltages and the movement of the machines while they are being adjusted. The components must be designed to shut down the machine in the event of any failure.

The Growth That Is To Come

Automation has just grown out of its diapers. The pioneering efforts of the 1930's and the numerous developments of recent years have demonstrated the potential of this method of production. There are few products other than automobile engines which combine machining with quality production. However, with the experience now available, and the variety

One of the largest automatic machine tool assemblies now in use. It is capable of machining 100 automobile engine blocks per hour. (Courtesy of The Cross Company)



of standard components, it is possible to apply this process to most manufactured parts. The ultimate development would be just one work handling for each part before final assembly.

Correspondingly radical changes are in store for raw material processing. New equipment for shell molding and conventional sand molding permits large-scale operations with just a handful of men. At the other end of production, automatic assembly is assuming greater importance as direct manufacturing costs go down. An impressive beginning has been made in the assembly of electronic subassemblies. The National Bureau of Standards' Operation Tinkertoy has demonstrated the possibilities of intricate automatic assemblies. Beyond the field of manufacturing lie two important fields for automation. Administration and distribution are contributing increasingly higher percentages of retail prices. Mechanized order filling and the use of computers for production decisions are examples of the trend in these fields.

ASME'S DIAMOND JUBILEE

AN IMPORTANT SERVICE TO technology is that of making available to scientists and engineers information about the technical accomplishments of their colleagues. Commercial publishers and professional societies share the major responsibility for this service.

Doing a highly effective job in disseminating technical information is the American Society of Mechanical Engineers, which this year commemorates the seventy-fifth anniversary of its founding. ASME publishes *Mechanical Engineering, Transactions of the ASME, Journal of Applied Mechanics, Applied Mechanical Reviews,* and *Mechanical Catalog.* These publications aid engineers by collecting and presenting significant technical information that, in turn, helps to spark new technical advance.

During this 75th anniversary year, engineers and scientists are saluting the Society for its accomplishments. These accomplishments go even beyond a fine series of publications. The history of ASME spans the great developments of modern technology including the electric power industry, the automobile, the airplane, the modern warship, the electronics industry, as well as industrial mass production. ASME has played an important part in all these and many others. Through its technical committees, ASME has developed industrial codes and standards—from screw threads to fire-fighting equipment—that have played a part in the advancement of almost 200 industries. Also, since World War I, the Society has sponsored research on problems critical to both the military and industry.

In celebrating its Diamond Jubilee, the Society has chosen the theme "The Engineer in Our World". Discussions at the major meetings of the year center about that theme. The Annual Meeting in Chicago, November 8 to 13, will be devoted to "The Engineer and the World of Commerce and Industry".

For ASME, the 75th anniversary is not a time of self-satisfaction. Instead, the organization, with its 40,000 professional members, is making plans to enlarge and intensify its contributions to technology and to society. In the future, as in the past, the Society will strive to make its motto, "By Truth and By Service to Enrich Mankind", a living principle.

Design Methods for Today's Needs

Effective and economical design studies can result from careful use in the laboratory of limited data from service tests.

by HORACE J. GROVER

A CENTURY AGO, DESIGN OF structural and machine components for adequate strength was relatively simple. The main criterion was sufficient static strength. There were not too many structural materials to choose from, and there were data on the ultimate tensile strengths of most of them. Uncertainties in design could usually be covered by the use of sufficiently large "factors of safety".

Today's needs pose a much greater challenge to engineering design. Many new sources of vibration and stress repetition make fatigue an important consideration. Impact loadings have been critical in some instances. Structural materials are used at higher temperatures, which makes creep and time-dependent behavior important. At the same time, there is increasing emphasis upon efficiency of design and attention toward making each pound of material contribute its share toward performance of the structure or component. Often this concern is one of economy in a competitive market; in other instances, such as in aircraft structures, design efficiency is a fundamental requirement for successful operation.

Many new materials are available to help design needs. High-strength steels, light-metal alloys, metals and alloys for high temperature service, and plastics and plastic laminates offer a large stock from which to choose.

New tools are available to aid determination of pertinent material properties. Wire strain gages, brittle lacquers, and electronic strain, deformation, and acceleration indicators help analyze service behavior and define pertinent properties. Some of these same tools also help in laboratory studies of components and provide the finer delineation of properties and detailed behavior required for best performance. Mechanical and electronic analogs and computers are additional tools to aid understanding of complex design requirements.

CORRELATING SERVICE AND LABORATORY STUDIES

To make wise use of new techniques in design for increasingly exacting requirements, continual attention to correlation between service performance and laboratory investigations is most important.

In many cases, information on performance under service conditions can be used to direct laboratory studies so that the latter provide extremely pertinent data. This fact has led to considerable interest in "simulated service" testing. The laboratory tests add useful information for one or more of these reasons: (1) they may be more readily controlled to help isolate variables; (2) they emphasize one critical condition with other simplifications; and (3) they may be more economical. In general, laboratory tests without adequate information concerning service performance may be unrealistic, while service experience alone may be too complex and expensive to provide quick and economical answers. Careful use of both field tests and laboratory studies, well correlated, has been very profitable in many design problems.

Since joining Battelle in 1942, Horace Grover has worked largely on problems relating to design strength of materials, fatigue of materials, and stress analysis. He has made numerous investigations covering materials for primary structures of aircraft, automobile springs, gas transmission pipelines, and rails. Dr. Grover is coauthor of the recent book *Fatigue of Metals and Structures*, and has contributed almost two score articles to technical journals. He received his Ph.D. in physics from Cornell University.

An interesting example is a study recently sponsored by a progressive builder of mobile homes. Company engineers suspected that the main structure of their coach might be highly "overdesigned". Accordingly, stresses in critical members were studied by use of bonded wire strain gages. An important concern was to load the structure in such a manner as to emphasize critical service conditions. One set of conditions was simulated by weights on the platform, as shown in the illustration on this page, distributed in accordance with careful estimates of all weights that would exist for furniture, occupants, and personal belongings. Another set of conditions included effects of dynamic loadings that might be encountered in moving the coach; these were evaluated from actual road tests with strain gage and accelerometer recordings. The laboratory study, under controlled conditions, afforded a chance to evaluate relatively quickly many details of stress distribution that could have been obtained in road tests, only at great expense in time and money. The limited road tests, on the other hand, supplied information concerning loadings without which it might have been impossible to relate laboratory data to service performance. The important philosophy underlying the entire study was continued attention to detailed requirements of service. The final result of this investigation is a redesigned structure that can be produced more economically and promises a more soundly designed trailer for service conditions.

Use of Analog Computer in Design

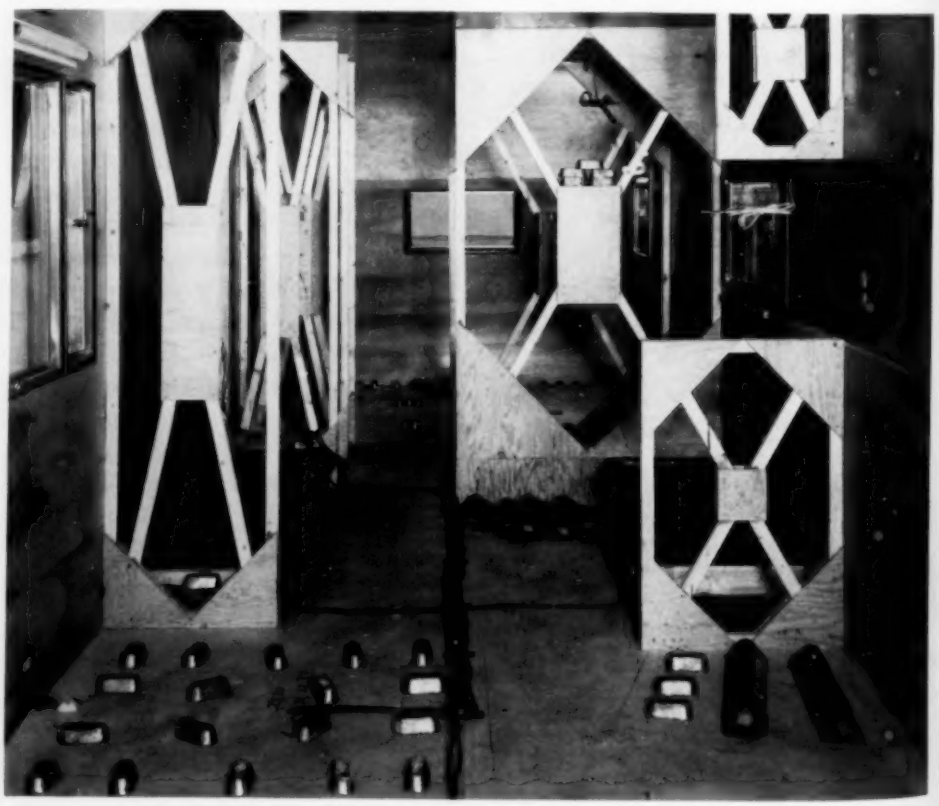
Laboratory evaluation of design can be combined with service testing in another way. Thus an investigation for the improvement of the design of automotive seat springs involved the use of an analog computer. In this problem it was necessary for the designer to keep in mind the many possible interactions in the entire automotive suspension system in finding the best overall insulation of the passenger from bumps and shocks of the road. The complexity of the entire system made straightforward mathematical calculation very difficult.

However, it was relatively simple to construct an electrical analog for study of the suspension system indicated in the block diagram on page 87. Application of an appropriate signal to the analog simulated a road bump on the tire, and suitable recordings from the analog corresponded to resulting motions and accelerations of the passenger. Simple circuit changes were made (in some instances by merely turning a dial) to correspond to feasible design changes in the cushion springs and the contribution of these to ride improvement was noted. Incidentally, in this study also, there were checks with actual service performance by comparison of behavior of the analog with service records of certain spring deflections studied in actual ride tests. The result of this exploratory study was a better understanding of the effects of several design factors upon performance of automobile seat springs. In turn, this provided indications of the improvement that could be expected from several feasible design changes.

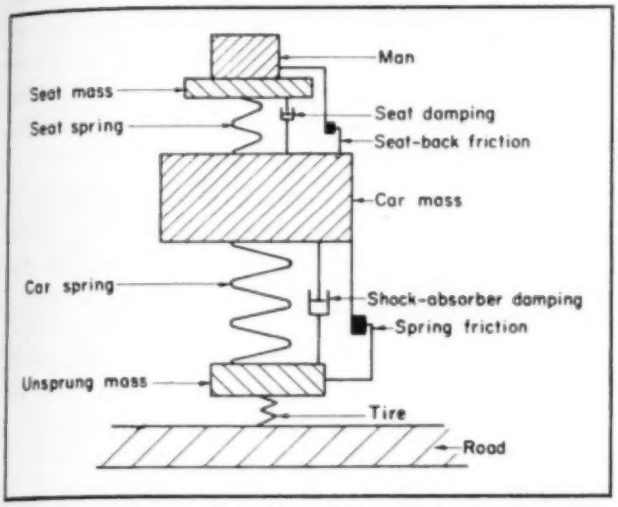
Stress on Factors Pertinent to Performance

The common factor in each of the two examples is the use of modern equipment to direct laboratory and

Laboratory tests on a trailer coach involved the use of weights distributed so as to reproduce forces encountered in severe service.



A diagrammatic presentation of the factors in an automobile suspension system as they were evaluated with a computer. The data were useful in determining the best design for seat springs.



shop development along lines directly pertinent to performance of the product under actual service loadings.

This emphasis upon factors directly pertinent to performance in the intended use of structures and components can make easier the wise use of modern materials and modern experimental tools in design for exacting requirements.

Service experience and "proving ground" tests can provide information concerning economic and technical importance of various design factors. Laboratory investigations and development studies can supply data on materials and on design alternatives. Information from both sources is important for optimum design, and it is most important that correlations are established between data from the two sources. Modern tools help in each type of study and, with proper use, in correlating the two.

It is both a challenge and a responsibility for the designer to strive for continued relation of laboratory data to field data in his problems. This approach, with the help of modern tools, can provide design information for more economical, safer, and more dependable structures and components.

THIN LINE OF DEFENSE

"A dozen species of plants and a smaller number of species of animals literally stand between mankind and starvation. We ought to know as much about each of these species as our engineers know about our bombers. Today we do not."

Paul Mangelsdorf

Notes From Battelle

PLANNING NUCLEAR-POWER PLANTS

"THE BASIC REQUIREMENTS of a nuclear reactor for producing power are the same as those of a power plant using conventional fuel," according to Sherwood L. Fawcett, specialist in nuclear engineering at Battelle. Dr. Fawcett spoke on "Research Tools for the Development of Atomic Power" before the Middle Eastern District Meeting of the American Institute of Electrical Engineers, at Columbus, Ohio.

The designer of a nuclear-power reactor faces a number of special problems. Among these, Fawcett said, is relative lack of previous experience—for there have been few such plants built. Secondly, a small-scale working model of a reactor cannot be built because a certain amount of "size" is necessary before fission reactions are possible.

"Still, nuclear engineers do have some ways of testing their plans", Fawcett continued. Reactor cores, where fission occurs, can be built, stocked with nuclear fuel, and then operated at "zero power", a very low power output, requiring little provision for cooling and shielding. Such a setup provides information on heat distribution in the core and expected life of the reactor.

Apart from problems of design there are the requirements for materials. All substances used in construction of reactors must be capable of withstanding the radiation they will be subjected to. Fawcett noted that hot cells, rooms where samples of radiated construction materials could be tested for mechanical properties, were available at various Government and private laboratories.

Protection for nuclear power-plant workers is another problem faced by the power-plant designer. It is met by use of tested shielding materials. Tests of this kind are often made in swimming-pool type reactors, where the radiation source is immersed in a pool of water for shielding.

"Complex facilities are needed as experimental tools for specialized studies required in atomic power development. Probably the greatest tool for power reactor development," Fawcett stressed, "is the sound engineering experience and know-how available from more conventional engineering fields."

He pointed out that Battelle Institute is currently spending one and one-half million dollars on an atomic energy center specifically for industrial research. Research there will be on peacetime uses of atomic energy, including nuclear plants for generating electrical power. The center will provide a zero-power facility for reactor development work, hot cells for evaluating radiated construction materials, and a swimming-pool reactor for investigating shielding materials.

MARKETS FOR CHEMICALS AND METALS

THE MARKETS for metals and chemicals are as limitless as man's imagination and his will to find them, Dr. Clyde Williams told members of the American Chemical Society recently at the Society's meeting in Cincinnati.

Commenting on the basic materials available for use in the creating of new products, new markets, and new businesses, Dr. Williams stated that there are some 500,000 organic chemical compounds known to science that are not produced commercially. There are also some 50 metallic elements that have not been developed commercially as metals or as alloying constituents.

Speaking before the Society's Division of Chemical Marketing and Economics, Dr. Williams pointed out that the chemical and metallurgical industries are "moving closer together all the time, becoming, in fact, almost inseparable". This consolidation of the interests of two basic industries is accelerating progress in each and is thus spurring industrial activity.

"We now see metals", he said, "being used in applications that were formerly considered strictly chemical, and vice versa. Uranium and thorium metals, for instance, are now regarded as fuels. Graphite, a nonmetallic, on the other hand, has become an important engineering material. Copper has come into use as a plant food, while nylon is being used as bearing material."

Dr. Williams discussed three approaches for developing markets for chemicals and metals. These

he said are: (1) to find more markets for products now being produced; (2) to develop products to satisfy existing or potential market needs; and (3) to find markets for chemicals and metals that are known and could be produced but which have not yet been produced commercially.

Technical research, combined with traditional market development techniques, is the key to new markets, Dr. Williams said, regardless of which of these three approaches is taken. He cited atomic energy and automation as two great areas of development that will provide new markets for chemicals and metals, and thus help to increase standards of living generally.

HUMAN RESPONSE EVALUATOR

A NEW ELECTRONIC device will soon be helping Army psychologists to conduct basic research on the human factors which limit personnel who use military equipment and carry out military tasks (such as guiding vehicles and aiming weapons). The new device, known as an "electronic pursuit apparatus", is actually a special-purpose computer which has been designed by, and is being assembled at Battelle for, the Army Medical Research Laboratory.

With this experimental computer, psychologists may simulate many static and dynamic target patterns. The path of the target, a bright solitary dot crossing the face of the 21-inch oscilloscope tube, may be varied considerably, thanks to the elaborate control system. The speed of the movement of the dot may, likewise, be varied from a point where it is relatively simple for the man to "track" a target to a point where following it is impossible. The operating characteristics of the apparatus can be changed to permit study of the nature of typical responses to a wide variety of control mechanisms.

John K. Wetherbee, of the Battelle staff, points out that Army psychologists are interested in more than static accuracy, which is the factor primarily involved in simple aiming tasks. The pursuit apparatus will tell the psychologists how well the man was able to follow a moving target, how often he was on target, when he was off target, and how far off he was. A paper-tape recording device in the unit provides a graphic record of the performance of each man tested. Test results recorded by the apparatus will assist in determining the basic capabilities and limitations of the human in performing complex, continuous tasks. Army developments agencies will be able to use this basic information of human capabilities in designing weapon systems which are more easily operable by men.

The Battelle-developed experimental pursuit apparatus will be installed at the Psychology Department of the Army Medical Research Laboratory, Fort Knox, Kentucky. According to the Project Officer at the Army Medical Research Laboratory, the elaborate apparatus will be used first to study the skills required in simple, continuous tracking tasks. It could also be used to study civilian jobs that draw heavily upon motor skills and perception.

NEGATIVE-TO-POSITIVE XEROGRAPHY

ONE OF THE advantages of the xerographic process is its ability to produce a positive image of a positive subject by a dry, electrical process of photography, without the need for an intermediate negative step. However, since some applications require

Camille Chamoun, president of the Republic of Lebanon, recently welcomed representatives of Battelle for a discussion of the program now under way to raise the level of industrial activity in that small, but important, country. In cooperation with the Lebanon Industrial Institute, Battelle technologists are gathering data that will be used in the study. Participants in the discussion at Beirut included from the left, Victor Andraos and Marwan Nasr, members of the staff of the Lebanese Industrial Institute; Salah Hibri, administrator of the Institute; President Chamoun; B. D. Thomas, associate director of Battelle; Frank C. Croxton, assistant director in charge of Battelle's European operations; and David M. Edwards and William R. Magness, both of Battelle.

that a positive xerographic print be prepared from an ordinary photographic negative, such a process has been developed cooperatively by The Haloid Company and Battelle for the United States Army Signal Corps.

R. E. Hayford of Haloid and W. E. Bixby of the Institute reported to the Society of Photographic Engineers that the xerographic process can be modified to give reversal development by altering the electrical field above the xerographic plate during the development process. The alteration can be achieved by using an electrode placed adjacent to the plate and maintained at a suitable potential. The amount of potential to be applied is determined by the specific image being processed. By proper adjustment of this potential, xerography can be made to function as a positive-to-negative or as a negative-to-positive process, and therefore it is applicable to photofinishing operations.

ANTIMONY OXIDE GLASS

GLASS THAT TRANSMITS a greater range of infrared rays than was possible heretofore has been developed at Battelle. Ordinarily, glasses are based on silicon, but such glasses do not transmit the longer infrared rays. The new glass is based on oxides of antimony.

The antimony oxide glass, which includes oxides of aluminum and the alkali metals as stabilizing agents, will transmit rays of about one-third more of the infrared spectrum than will ordinary glass. Light rays longer than those absorbed by water vapor are also transmitted by the new glass. A paper describing this development was given by Walter A. Hedden and Burnham W. King, Battelle ceramists, at the Cincinnati meeting of the Glass Division of the American Ceramic Society.

They reported that when sufficient colorants were added to render the glass opaque to all visible light, except the long-wavelength reds, transmission of infrared was only slightly diminished. Other properties of the glass were found to be in the same range as those of silicate glasses.

The technologists noted that little work had been done on antimony oxide glasses before their present experiments. Hedden and King foresee possible uses for antimony oxide glass in analytical equipment and special optical systems, such as signaling devices. The research on uses for antimony oxides as a glass-forming material was sponsored by the Bradley Mining Company, San Francisco.

METALS AND U. S. LIVING STANDARDS

"THE SECRET of our standard of living is that we consume the largest part of what we produce," declared John D. Sullivan, technical director of Battelle, when he addressed the 37th Annual Meeting of the American Zinc Institute in Chicago. Mr. Sullivan held that production is not a measure of living standard, but consumption is such a measure. "American industry realizes that mass production can succeed only when we have mass consumption. By a realistic wage and price scheme we enable our workers to consume the largest part of our production."

Pointing to the basic role that metals have in our economy, Mr. Sullivan observed that the United States, with some effort, has been able to exceed the limits of her own natural resources. "For example," he said, "we consume approximately one-third of the world's steel, even though we are almost entirely lacking in such metals as manganese, nickel, cobalt, and columbium—metals that are necessary for production of steel alloys."

Total metal consumption has steadily and markedly increased throughout our history. Mr. Sullivan declared that with this increase came the increases in numbers of telephones, transportation equipment, household appliances, quality plumbing, and agricultural implements. Because so much of our living depends on these products and scores of others not mentioned, he concluded that the U. S. should consume more metals to increase its standard of living.

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Dr. William J. Harris, of Battelle, has been named Assistant to the Director and will be headquartered in Battelle's office in Washington, D. C. In his new assignment Dr. Harris will represent Battelle in its relationships with the numerous governmental organizations that sponsor research in the Battelle laboratories.

Before becoming associated with Battelle a year ago, Dr. Harris served for three years as Executive Secretary of the Minerals and Metals Advisory Board of the National Academy of Science and the National Research Council. Prior to that, he was head of the Ferrous Alloys Branch of the Metallurgy Division, Naval Research Laboratory, at Washington. Much of his work has been in the areas of ferrous physical metallurgy and the metallurgy of armor plate and ship plate. In 1950, Dr. Harris was the corecipient of the Matheson Medal presented by the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers.

Writings by Staff Members*

Research Finds Answers to Gravure Problems. Donald J. Byers. *Gravure*, March, 1955, pp. 24-25.

Reports progress in research on cylinder preparation at Battelle Institute sponsored by Gravure Research, Inc. Improved procedures were developed for sensitizing tissue, exposure, and etching.

Tritium Determines Moisture Gradient in Attached Protective Coatings. G. D. Calkins, M. Pobereskin, V. E. Young, and L. J. Nowacki. *Nucleonics*, February, 1955, pp. 76-77.

A procedure was developed, using tritiated water as a radioactive tracer, to determine the concentration and penetration of moisture into attached protective coatings. Preliminary results with one varnish indicated that this coating was actually hygroscopic.

Battelle Mud Study, V: For Chip Clearance Adequately High Fluid Velocity Required; Search for Mud Properties. Donald Gideon and Ralph Simon. *Drilling Contractor*, February, 1955, pp. 67-68, 70.

Experiments show that chip-clearance times are related to fluid properties and to design of fluid courses in the bit. A jet bit clears chips faster in all fluids tested, and action of the jet can be improved by properly directing the jet streams.

General Physical Metallurgy of Titanium Review. Robert I. Jaffee. *Journal of Metals*, February, 1955, pp. 247-252.

Reports that the principles which have been developed by metallurgists working on titanium alloys over the past seven years are becoming of great use in connection with the development of new alloys and heat treatments to improve mechanical properties These principles were developed by basic studies in titanium metallurgy. It is expected that emphasis on fundamentals will continue the rapid progress that has been made.

Magnetic Oxygen Measurement With Hot Wire Arrangement (Magnetische Sauerstoff-Messung mit Hitzdraht- Anordnung). H. Krupp. *Chemie-Ingenieur-Technik*, February 1955, pp. 79-83.

Description of the method, based on the phenomenon of the magnetic wind. To demonstrate its application, the construction of the magnetic O recorder, MAGNOS 5, is given.

Influence of Group VI Hydrides on Hydrocarbon Flame Speeds. Philip F. Kurz. *Industrial and Engineering Chemistry*, February, 1955, pp. 297-302.

Study showed that hydrogen sulfide lowers the flame speeds of C_3 alkanes and alkenes more than would be expected from the percentage of this hydride in the mixture. Hydrogen selenide reduced the flame speed of propane markedly and proved to be an even more effective combustion inhibitor than hydrogen sulfide.

Brazing Titanium to Titanium and to Mold and Stainless Steels. W. J. Lewis, P. S. Rieppel, and C. B. Voldrich. *Wright Air Development Center Materials Laboratory, WADC Technical Report 52-313*, pt. 1, November, 1952. *U. S. Department of Commerce, Office of Technical Services, PB 111244.*

Reports an investigation of procedures and alloys suitable for brazing titanium. The most satisfactory alloys for furnace brazing were silver and silver base alloys. Good joints were also made by torch brazing.

A Study of Investment Materials. H. O. McIntyre. *Foundry*, March, 1955, pp. 96-99.

Describes some of the more common types of investments used for making precision investment castings. Characteristics of the raw materials and properties of the investments are presented.

Cost Factors in Selecting Processes for Producing Iron and Steel. Hamnett P. Munger. Section from United Nations Publication, *Survey of World Iron Ore Resources.*

Describes and indicates methods which may be used as a first approximation in determining the cost of smelting iron ore and producing steel as related to the cost of raw materials and energy at various locations throughout the world. Includes both conventional and unconventional processes.

Copper-Tin Alloy Plating. W. H. Safranek and C. L. Faust. *American Electroplaters' Society, Proceedings*, vol. 41, 1954, pp. 201-208.

Copper-tin alloy plates in the composition range of 17 to about 50 per cent tin, the balance copper, exhibited good leveling properties and good protection against corrosion. Bronze plus chromium plates were greatly superior to copper plus chromium. Because of its good performance, bronze alloy is being considered seriously as a replacement for nickel plate.

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**Members of the Battelle staff are authors of the recently published articles and books listed on this page. In most cases, reprints are available from the Battelle Publications Office, 505 King Avenue, Columbus 1, Ohio.*

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BATTELLE TECHNICAL REVIEW ABSTRACTS

Volume 4, Number 7 July 1955

***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

AERONAUTICAL ENGINEERING

8576 Guidance and Control of Swiss Type 54 Ground-to-Air Missile. Alfred Gerber. *Aviation Age*, v. 23, May 1955, p. 16-25.

Rocket-propelled Oerlikon missile uses unique combination of thrust deflection, rudders, and wing displacement to "stay on the beam" that guides it to its target. Photographs, diagrams, graphs.

8577 Spaceship Instrument Study Needed Now. George W. Hoover. *Aviation Week*, v. 62, May 2, 1955, p. 30, 32, 34.

Development problems, facing American industry, include instrumentation for the control and operation of manned space vehicles. Photograph, diagrams.

8578* How Magnesium Can Simplify Airframe Design. J. P. Donald Garges. *Modern Metals*, v. 11, Apr. 1955, p. 40-42, 44.

Improvement in the ductility of the available magnesium alloys has placed them in the acceptable range for aircraft structural applications. Photographs, graph.

8579 Development of Large Intermittent Wind Tunnels. J. Lukasiewicz. *Royal Aeronautical Society, Journal*, v. 59, Apr. 1955, p. 259-278.

Relative merits of continuous and intermittent installations are discussed. Diagrams, tables, graphs, photographs. 18 ref.

8580 Subsonic Plane Flow in an Annulus or a Channel With Spacewise Periodic Boundary Conditions. L. C. Woods. *Royal Society, Proceedings*, v. 229, ser. A, Apr. 5, 1955, p. 63-85.

Types of boundary conditions considered are shape of the walls, pressures or velocities on the walls, and pressures on one wall and shape of the other wall. Diagrams. 9 ref.

8581 A Suggested Method for Calculating the Stresses in Wings With Nonrectangular Plates. Börje Langefors. *SAAB Aircraft Company, Technical Notes, SAAB TN* 23, 1953, 11 p. (TL504 Sv23t.)

Analysis of oblique plates by the aid of superposition of elementary solutions. Diagrams. 5 ref.

8582 Electronic Flight Simulators Streamline Air Force Operations. Albert J. Forman. *Tele-Tech & Electronic Industries*, v. 14, May 1955, p. 68-70, 148-149.

Electro-mechanical training device which faithfully reproduces the operation, performance, and design of a specific type of aircraft. Photographs, diagram, table.

Books and Miscellaneous Publications

8583 Papers Presented at the Fifth Meeting of the Wind Tunnel and Model Testing Panel. 192 p. 1954. Advisory Group for Aeronautical Research and Development, Paris. (TL567.W5 N81.1p)

Ten papers presented at the fifth meeting of the wind tunnel and model testing panel on design and techniques used in construction of oscillating, high speed, and jet engine driven tunnels.

See also:

9012 (relays for guided missiles)
9073 (aircraft antennas)
9172 (aircraft for geological surveying)
9176 (airborne radar for weather detection)
9804 (aircraft welding)

AGRICULTURE

8584* 4-Hydroxy-Piperidine-2-Carboxylic Acid in Green Plants. (English.) Artturi I. Virtanen and Sigrid Kari. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 170-171.

Chromatographic isolation. Chromatograms.

8585* Fixation of Nitrogen by Nodules Excised From Illuminated and Darkened Pea Plants. (English.) Artturi I. Virtanen, Tauno Moisio, and R. H. Burris. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 184-186.

Nitrogen-15 shows N fixation ability in relation to illumination. Table, graph. 2 ref.

8586* Soil Nourishment of Plant and the Fertilization of Fields. **Pochvennoe pitanie rastenii i udobrenie polei.** (Russian.) T. D. Lysenko. *Agrobiologiia*, 1955, no. 1, Jan.-Feb., p. 3-16.

Effects of superphosphates, lime, etc., in different proportions; mulching procedures; microflora. Table. 2 ref.

8587* Some Data on Nourishment of the Cotton Plant Through the Roots. **Nekotorye dannye o kornevom pitanii khlopchatnika.** (Russian.) M. A. Belousov. *Agrobiologiia*, 1955, no. 1, Jan.-Feb., p. 76-85.

Influence of nourishment, during seed formation, on plant development and future crops. Tables, photographs.

8588* Potassium Silicates of the Soil as a Plant Nutrient. **Silikaty kaliia pochvy kak istochnik etogo elementa dlia rastenii.** (Russian.) S. A. Kudrin. *Agrobiologiia*, 1955, no. 1, Jan.-Feb., p. 90-99.

Includes tables. 16 ref.

8589* Response of Soybean Strains to 2,4-D and 2,4,5-T. H. A. Fribourg and I. J. Johnson. *Agronomy Journal*, v. 47, Apr. 1955, p. 171-174.

Test of herbicides on the growth and reproduction in soybeans of oriental strains. Tables, photographs. 4 ref.

8590 The Leaf Structure of Poa Annua With Observations on Its Smog Sensitivity in Los Angeles County. Ruth Ann Bobrov. *American Journal of Botany*, v. 42, May 1955, p. 467-474.

Includes diagrams, micrographs, photographs. 19 ref.

8591* The Effect of Herbicides on Soil Microorganisms. I. The Effect of 2,4-Dichlorophenoxyacetic Acid on Some Phases of the Nitrogen Metabolism of *Bacillus cereus*. Emmett J. Johnson and Arthur R. Colmer. *Applied Microbiology*, v. 3, Mar. 1955, p. 123-126.

Effect of 2,4-D upon the activities of one of the common sporeforming rods, *Bacillus cereus*, in the decomposition of gelatin and an amino acid substrate. Graphs. 13 ref.

Agriculture

8592 *p*-Chlorobenzyl *p*-Chlorophenyl Sulphide. J. E. Cranham and B. A. Stevenson. *Chemistry & Industry*, 1955, no. 14, Apr. 2, p. 383.

Field results of the pesticide against red spider mites. Table.

8593* Migration of Chlorophyll in Plants. **O peremeshchenii khlorofilla v rasteniiakh.** (Russian.) V. O. Kazarian and E. S. Avundzhian. *Doklady Akademii Nauk SSSR*, v. 101, no. 1, Mar. 1, 1955, p. 181-183.

Includes tables. 6 ref.

8594* Effect of Soil Temperature on Amino Nitrogen Content in Plants. **O vliianii temperatury pochvy na soderzhanie aminnogo azota v rasteniiakh.** (Russian.) V. P. Dadykin, V. D. Shalitskaia, and L. F. Maternykh. *Doklady Akademii Nauk SSSR*, v. 101, no. 2, Mar. 11, 1955, p. 367-369.

Includes table, graphs. 7 ref.

8595* Weed Control in Western Canada. P. O. Ripley. *Empire Journal of Experimental Agriculture*, v. 22, no. 88, Oct. 1954, p. 261-266.

Early chemicals used for weed control. Growth regulators and advances in chemical weed control. Table. 6 ref.

8596* Effects of Calcic and Magnesian Liming Materials on the Calcium and Magnesium Contents of Crops and Pasture. J. W. S. Reith. *Empire Journal of Experimental Agriculture*, v. 22, no. 88, Oct. 1954, p. 305-313.

Includes graphs, tables. 12 ref.

8597* A Comparison of the Effects of Organic and Inorganic Fertilizers on the Growth and Yield of Potatoes. I. W. Selman and V. M. Durham. *Empire Journal of Experimental Agriculture*, v. 22, no. 88, Oct. 1954, p. 314-322.

Includes tables, graphs. 4 ref.

8598* Conversion of Monosaccharides to Sucrose and Cellulose in Wheat Seedlings. J. Edelman, V. Ginsburg, and W. Z. Hassid. *Journal of Biological Chemistry*, v. 213, Apr. 1955, p. 843-854.

Transformation of C^{14}-labeled glucose and fructose was studied in actively metabolizing wheat seedlings. Tables, graphs. 26 ref.

8599 Response of Moths of the Pink Bollworm and Other Cotton Insects to Certain Ultraviolet and Visible Radiation. Perry A. Glick and Joe P. Hollingsworth. *Journal of Economic Entomology*, v. 48, Apr. 1955, p. 173-177.

Tests were conducted with 23 sources of radiation to determine their attractiveness to the pink bollworm moth. Photographs, tables. 2 ref.

8600* New Organic Phosphorous Compounds as Insecticides. **Újabb foszfortartalmú szerves vegyületek, mint inszekticidek. I.** Mixed Anhydrides. **Vegyes anhidridek. II.** Production and Effect of S-(2-Acetyl-2-Carboethoxy)-Alkyl-O,O-Dimethyl-Dithio Phosphoric Acids and Their Derivatives. **S-(2-acetil -2-karboetoxi)-alkil-O,O-dimetil-ditiofoszforsavak és származékaik előállítása és inszekticid hatása.** (Hungarian.) Károly Szabó, György Matolcsy, and Lászlóné Görög. *Magyar Kémiai Folyóirat*, v. 61, no. 3, Mar. 1955, p. 80-89.

Includes tables, structural formulas. 19 ref.

8601 Internal Seed Disinfection by an Antibiotic From *Streptomyces rimosus*. J. Dekker. *Nature*, v. 175, Apr. 16, 1955, p. 689-690.

Seeds are soaked in a suspension prior to planting. Tables, graph.

8602 New Soluble Nitrogen Compounds (Amino- and Imino-Acids and Amides) in Plants. N. Grobbelaar, John K. Pollard, and F. C. Steward. *Nature*, v. 175, Apr. 23, 1955, p. 703-708.

Survey of recently isolated products. Tables, chromatograms, infra-red spectra. 31 ref.

8603* Effect of Synthetic Soil Conditioners on Plant Nutrient Uptake. K. J. McNaught. *New Zealand Journal of Science and Technology*, v. 36, sec. A, no. 5, Feb. 1955, p. 450-453.

Includes tables. 4 ref.

8604* Screening Tests With Insecticides for Control of Red Spider-Mite (*Tetranychus urticae* Koch) on Beans. H. Jacks. *New Zealand Journal of Science and Technology*, v. 36, sec. A, no. 5, Feb. 1955, p. 454-459.

Forty-one insecticides were tested. Effective substances are classified according to contact, residual, and the combined effects. Tables.

8605* The Effects and Interactions of Sulphur, Phosphorus, and Molybdenum on the Growth and Composition of Clovers. T. W. Walker, A. F. R. Adams, and H. D. Orchiston. *New Zealand Journal of Science and Technology*, v. 36, sec. A, no. 5, Feb. 1955, p. 470-482.

Includes tables, graph. 34 ref.

8606* The Use of Chemical Thinning Sprays on Apple Trees in New Zealand. I. Preliminary Experiments in Hawke's Bay and Nelson. R. M. Davison. *New Zealand Journal of Science and Technology*, v. 36, sec. A, no. 5, Feb. 1955, p. 506-515.

Sprays of sodium dinitro-ortho-cresylate, alphanaphthalene acetic acid, and sodium 2-methyl-4-chloro-pehnoxyacetic acid were tested at a range of concentrations as thinning agents on three apple varieties. Tables. 8 ref.

8607* Basic Principles of the Classification of Soils. **Ob osnovnykh printsipakh klassifikatsii pochv.** (Russian.) K. P. Gorshenin. *Pochvovedenie*, 1955, no. 2, Feb., p. 73-78.

Soil-forming processes; concept of soil types.

8608* Method of Determination of Gas Exchange Between Soil and Atmosphere and of the Content of Carbonic Acid in the Soil Air. **K metodike opredeleniia gazoobmena mezhdu pochvoi i atmosferoi i soderzhaniia uglekisloty v pochvennom vozdukhe.** (Russian.) B. N. Makarov. *Pochvovedenie*, 1955, no. 2, Feb., p. 85-87.

Includes photographs, table. 8 ref.

8609* Biological Role of Boron. **Biologicheskaia rol' bora.** (Russian.) M. Ia. Shkol'nik. *Priroda*, v. 44, no. 4, Apr. 1955, p. 89-94.

Investigates water cultures of flax and wheat. Effect of H_2O_2, Fe, and Mg connection with B. Photographs, micrographs.

8610 Dicentrics in Wheat. J. W. Morrison. *Science*, v. 121, Apr. 22, 1955, p. 604-605.

Chromosomic configuration in plants from radiation damaged seed. Micrographs, table. 4 ref.

8611* Iron Nutrition of Plants at High pH. P. C. de Kock. *Soil Science*, v. 79, Mar. 1955, p. 167-175.

Various effects are discussed with special reference to the P-Fe ratio as an index of the Fe status of plants. Tables. 27 ref.

8612* Method for the Determination of "Redox" Potentials in Soil. **Zur Methodik der Bestimmung des Redoxpotentials im Boden.** (German.) W. Flaig, K. Scharrer, and G. K. Judel. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, v. 68, no. 2, 1955, p. 97-122 + 1 plate.

Reduction-oxidation reactions in soils. Tables, diagrams, photographs. 32 ref.

8613* Determination of Redox-Potentials in Different Soil Profiles. **Bestimmung des Redoxpotentials von Bodenprofilen.** (German.) W. Flaig, K. Scharrer, and G. K. Judel. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, v. 68, no. 3, 1955, p. 203-218.

Includes tables, diagrams. 16 ref.

8614 Chemistry of the Soil. Firman E. Bear, editor. American Chemical Society Monograph Series No. 126. 373 p. 1955. Reinhold Publishing Corp., New York. (S593 B38c)

Cation and anion exchange phenomena; organic matter; fixation of plant nutrients; oxidation-reduction processes; trace elements; and plant nutrition.

See also:

8833 (organo-phosphorus insecticides)
9004 (effect of fungus on electrical insulation)

BIOCHEMICAL AND BIOPHYSICAL RESEARCH

8615* The Effect of Tryptophan Analogs on the Induced Synthesis of Maltase and Protein Synthesis in Yeast. Harlyn Halvorson, S. Spiegelman, and R. L. Hinman. *Archives of Biochemistry and Biophysics*, v. 55, Apr. 1955, p. 512-525.

Includes graphs, tables, diagrams. 28 ref.

8616* Symposium on Radiation Effects on Cells and Bacteria. Albert Kelner, W. Dexter Bellamy, G. E. Stapleton, and Max R. Zelle. *Bacteriological Reviews*, v. 19, Mar. 1955, p. 22-44.

Four papers presented at the annual meeting of the Society of American Bacteriologist dealing with the effects of radiation on bacterial inactivation and mutation. Graphs, table, diagram. 77 ref.

8617 Group Classification of Virus Preparations by Infrared Spectroscopy. Albert A. Benedict. *Journal of Bacteriology*, v. 69, Mar. 1955, p. 264-269.

Infra-red absorption spectroscopy for identification. Graphs. 17 ref.

8618 A New Antibiotic of Bacterial Origin. A. T. Fuller. *Nature*, v. 175, Apr. 23, 1955, p. 722.

Preparation and properties of a substance from the *B. pumilis* group.

8619* Investigations on Photosynthesis; The Hill Reaction. (English.) J. S. C. Wessels. *Philips Research Reports*, v. 9, Apr. 1954, p. 140-159; June 1954, p. 161-196.

Photochemical reduction of various quinones and dyes by isolated chloroplasts. Diagrams, graphs, tables. 91 ref.

8620* Radiation Inactivation of Enzymes Inside and Outside Intact Cells. Wilson F. Powell and Ernest Pollard. *Radiation Research*, v. 2, Apr. 1955, p. 109-118.

Includes graphs. 13 ref.

8621* Bacteriophage as Indicator in Radiation Chemistry. Tikvah Alper. *Radiation Research*, v. 2, Apr. 1955, p. 119-134.

Includes diagram, photograph, graphs, tables. 25 ref.

Books and Miscellaneous Publications

8622 The Lipids. Their Chemistry and Biochemistry. Harry J. Deuel, Jr. v. II. Biochemistry—Digestion, Absorption, Transport and Storage. 919 p. 1955. Interscience Publishers, New York. (QP751 D48L)

Studies of characteristics and behavior in animal bodies.

See also:

8601 (antibiotics for seed disinfection)
8759 (decomposition of catalase)
9222 (electronic blood-count meter)

CERAMICS AND CONCRETE

8623* Strength Variations in Ready-Mixed Concrete. A. E. Cummings. *American Concrete Institute, Journal*, v. 26, Apr. 1955, p. 765-772; *ACI Proceedings*, v. 51, 1955, p. 765-772.

Statistical analysis of the variations in crushing strength of concrete test cylinders made of commercial ready-mixed concrete. Tables, graphs.

8624 Quantitative Evaluation of Thermal Shock Resistance. S. S. Manson and R. W. Smith. *American Society of Mechanical Engineers, Paper No.* 54-A-263, 1955, 56 p. (TJ1 Am35p)

Mathematical analysis of stresses and strains in BeO and other brittle materials. Table, graphs, diagrams. 12 ref.

8625 Studies of Uniformity of Compressive Strength Tests of Ready Mixed Concrete. Delmar L. Bloem. *ASTM Bulletin*, 1955, no. 206, May, p. 65-70.

Includes tables, graphs. 4 ref.

8626* Effect of Water/Cement Ratio on the Contribution Made By Powdered Admixtures to the Strength of Blended Portland Cement Mortars. K. M. Alexander. *Australian Journal of Applied Science*, v. 6, Mar. 1955, p. 61-77.

Includes tables, graphs. 8 ref.

8627* Uralite Insulators for Auto and Tractor Spark Plugs. **Izoliatory iz uralita dlia avtotraktornykh zapal'nykh svechei.** (Russian.) A. D. Usanov and Kh. M. Shkol'nik. *Avtomobil'naia i traktornaia promyshlennost'*, 1955, no. 3, Mar., p. 15-16.

Chemical composition; physico-chemical properties; effect of heat treatment. Graphs, tables, photograph.

8628* Reaction in Solid State of Mica-Lime Mixture Under Heating. **Reaktionen im festen Zustand beim Erhitzen von Glimmer-Kalk-Gemischen.** (German.) L. Stegmüller and P. Ney. *Berichte der deutschen keramischen Gesellschaft*, v. 32, no. 2, Feb. 1955, p. 27-36.

Influence of composition of mixture, grain size, and temperature. Tables, diagrams. 19 ref.

8629* Application of the Theory of Heat Conductivity to the Particular Problems of Silicate Industry. **Zur Anwendung der Theorie der Wärmeleitung auf spezielle, silikattechnische Probleme.** (German.) E. Deeg. *Berichte der deutschen keramischen Gesellschaft*, v. 32, no. 2, Feb. 1955, p. 37-49.

Calculation of heat distribution in silicate products. Tables, diagrams. 27 ref.

8630* Dilatometric Measurement Applied to Ceramic Raw Materials. **Dilatometrische Messungen an keramischen Rohstoffen.** (German.) A. Zwetsch. *Berichte der deutschen keramischen Gesellschaft*, v. 32, no. 3, Mar. 1955, p. 63-69.

Possibility of application; advantages of the method. Tables, diagrams. 19 ref.

8631* Hot Preparation of Refractory Rough Ceramic Masses. **Heissaufbereitung feuerfester und grobkeramischer Massen.** (German.) C.-J. Lenz. *Berichte der deutschen keramischen Gesellschaft*, v. 32, no. 3, Mar. 1955, p. 72-75.

Advantages and disadvantages of using steam instead of mixing with water. Tables, graphs. 2 ref.

8632 Profitable Returns From Expansion of Blast Furnace Slag for Light Weight Aggregate. S. P. Kinney and Fred Osborne. *Blast Furnace and Steel Plant*, v. 43, May 1955, p. 493-501.

Combination of economy, strength, lightness of weight, insulating qualities, and appearance of the items produced makes this expanded slag an important factor in the construction material field. Tables, photographs. 1 ref.

8633 The Differentiation of Aluminous Materials by Contraction Tests. J. F. Hyslop. *British Ceramic Society, Transactions*, v. 54, Mar. 1955, p. 113-118; disc., p. 118-119.

Contraction tests of clay grog, calcined kyanite, calcined bauxite, and calcined alumina are given for temperatures of 1,450 and 1,600 C. Data show effects of Na_2O, K_2O, MgO, and CaO on the shrinkage of these materials. Graphs, tables. 2 ref.

8634 Preparing Polished Surfaces for Microscopic Examination in Reflected Light. I. Preparation of Laps. II. A Carrier for Automatic Polishing. E. W. Roberts. *British Ceramic Society, Transactions*, v. 54, Mar. 1955, p. 120-136.

Disadvantages of polishing with free abrasives on cloth laps, and with fixed abrasives by elaborate existing techniques. Diagrams, graph, photographs, micrographs. 2 ref.

8635 Kinetics of the Thermal Dehydration of Clays. I. Dehydration Characteristics of the Clay Minerals. II. Isothermal Decomposition of the Clay Minerals. P. Murray and J. White. *British Ceramic Society, Transactions*, v. 54, Mar. 1955, p. 137-187.

Includes graphs, tables. 52 ref.

8636* A Method of Reducing Water Absorption in Sanitary Ware. L. Grice. *British Clayworker*, v. 64, Apr. 1955, p. 11, 14.

Use of water repellant materials on the unglazed surfaces of the ware prevents moisture absorption. Graph.

Ceramics and Concrete

8637 Stability of Inorganic Compounds in High Vacuum. M. Auwärter. *Henry Brutcher Translation No.* 3425, 8 p. (From *Plansee (Austria) Proceedings*, 1952, p. 1-7.) Henry Brutcher, Altadena, Calif.

Effects of temperature and high vacuum on reduction and sintering of various metal oxides. Diagrams, graphs, photograph. 1 ref.

8638 Clays and Clay Technology. Proceedings of the First National Conference. Joseph A. Pask and Mort D. Turner. *California Department of Natural Resources of Mines, Bulletin* 169, 1955, 326 p. (TN21 C12b)

Summarizes fundamental knowledge of clays gained in all fields, along with its application to clay technology. Graphs, tables, micrographs, diagrams, photographs.

8639* Edge Runner Mill and Dolomite. **Le malaxeur à meules et la dolomie.** (French.) Delong. *Centre Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 12, no. 3, 1955, p. 583-589.

Describes tests on the dry milling of sintered dolomite on an edge runner mill. Table, graphs.

8640 Some Ceramic Mechanisms and New Materials. John H. Koenig and S. C. Lyons. *Ceramic Age*, v. 65, sec. 1, Apr. 1955, p. 26 + 13 pages.

Contributions of the electron microscope, differential thermal analysis, and X-ray diffraction to adavnces in clay technology. Micrographs, diagrams, graphs, tables.

8641* Effect of Dehydration and Hydration of Surface of Porous Glasses on Their Adsorption Properties. **Vliianie degidratatsii i gidratatsii poverknosti poristykh stekol na ikh adsorptsionnye svoistva.** (Russian.) S. P. Zhdanov. *Doklady Akademii Nauk SSSR*, v. 100, no. 6, Feb. 21, 1955, p. 1115-1118.

Includes graphs. 5 ref.

8642* Development and Properties of a Concrete Which Sets Under Frost Conditions. **Poluchenie betona, tverdeiushchego na moroze, i ego svoistva.** (Russian.) M. I. Furman, R. E. Litvinova, and E. V. Lavrinovich. *Gidrotekhnicheskoe Stroitel'stvo*, v. 24, no. 1, 1955, p. 26-30.

Laboratory and field tests on concrete containing 17 to 20% of $CaCl_2$. Satisfactory results were obtained at temperatures as low as − 20 C. Tables. 5 ref.

8643 Thermal Emissivity of Refractories and Its Importance for Glass Furnace Operation. *Glass Industry*, v. 36, Apr. 1955, p. 193-197, 228.

Includes graphs, tables. 4 ref.

8644* A High-Temperature Furnace. **Un four à haute température.** (French.) *Industrie céramique*, 1955, no. 460, Jan., p. 1-5.

Functioning of a high-temperature furnace permitting a wide range of heating rates. Diagram, graphs.

8645* Fabrication of Refractory Products Having a Bauxite Base. **Fabrication de produits réfractaires à base de bauxite.** (French.) L. Hachet. *Industrie céramique*, 1955, no. 461, Feb., p. 44-46.

Includes tables. 1 ref.

8646* Improvements in the Qualities of Nonplastic Clays by Action on the pH. **Améliorations des qualités des argiles maigres par action sur le pH.** (French.) L. Alviset. *Industrie céramique*, 1955, no. 462, Mar., p. 63-77.

Tests for improving compression qualities of clays and their industrial possibilities. Tables, graphs, photographs.

8647 Refractories in the Iron and Steel Industry. III. Refractories in the Blast Furnace. Helen Towers. *Iron & Steel*, v. 28, Apr. 1955, p. 129-134.

Review of refractory materials for the stack, bosh, and hearth and an analysis of the factors leading to destruction in each location. 55 ref.

8648 Solid-State Reactions and Dielectric Properties in the System Magnesia-Lime-Tin Oxide-Titania. L. W. Coughanour, R. S. Roth, S. Marzullo, and F. E. Sennett. *Journal of Research, National Bureau of Standards*, v. 54, Mar. 1955, p. 149-162.

A general study in connection with ceramic dielectrics. Tables, graphs, phase diagrams. 15 ref.

8649* Some Technical and Economic Aspects of the Production and Use of Light Concrete and the Use of Coal Tailings in Construction. **Quelques aspects techniques et économiques de la farbrication et de l'emploi des bétons légers et de l'utilisation des déchets de l'exploitation houillère dans la construction. III.** Production of Light Aggregates From Coal Tailings. **Fabrication d'agrégats légers a partir des déchets de l'exploitation houillère.** (French.) A. Jarrige. *Revue des matériaux de construction*, C, 1955, no. 472, Jan., p. 1-8; disc., p. 8.

Includes photograph, graphs.

8650* Transmission of Heat in the Rotary Cement Kiln. **La transmission de chaleur dans le four rotatif à ciment. II.** Study of Heat Transmission. **Étude de la transmission de chaleur.** (French.) Albert Folliot. *Revue des matériaux de construction*, C, 1955, no. 472, Jan., p. 9-12; no. 473, Feb., p. 31-44.

Determination and measurement of loss of flux through the wall of the kiln. Calculation of energy accumulated in the wall then yielded to the material. Diagrams, graphs, micrographs. (To be continued.)

8651* Study of Shrinkage of Cellular Concrete. **Etude sur le retrait du béton cellulaire.** (French.) R. Senouillet. *Revue des matériaux de construction*, C, 1955, no. 472, Jan., p. 13-32; no. 473, Feb., p. 49-55.

Experiences on coating ribbed slabs of vibrated cement, size 8 m. x 2.50, with a cellular concrete 3 to 4 cm. thick. Photographs, diagrams, graphs, tables.

8652* Testing Ti Bricks in a Rotary Cement Furnace. **Essais de briques au titane dans un four rotatif à ciment.** (French.) F. Matouschek. *Revue des matériaux de construction*, C, 1955, no. 473, Feb., p. 45-47.

Test to determine if the bricks would prevent ring formation in a rotary cement kiln. Graphs, diagram.

8653* **The Manufacture of Synthetic Diamonds.** Leon G. Davis. *South African Mining and Engineering Journal*, v. 66, pt. 1, Mar. 19, 1955, p. 91, 93, 95.

History of the project, the techniques used, and the implications of the results are discussed. Photographs.

8654* **Synthetic Asbestos and Substitutes.** W. E. Sinclair. *South African Mining and Engineering Journal*, v. 66, pt. 1, Mar. 19, 1955, p. 97, 99.

Many of the fiber substitutes are of definite value in the asbestos productive field. Table, photograph.

8655* Problem of Determining the Direction and Intensities of Stresses in Self-Stressed (Tempered) Glass. **Le problème de la détermination du sens et de l'intensité des contraintes dans le verre auto-contraint.** (French.) Paul Acloque. *Verres et réfractaires*, v. 9, no. 1, Jan.-Feb. 1955, p. 3-12; disc., p. 12.

Study of self-stressing in glass by methods of surface refractometry and separation of stresses by oblique incidence birefringence. Diagrams. 4 ref.

8656* Determining the Quality of Quartz in Parallel Resonance. **Gütebestimmung von Quarzen in Parallelresonanz.** (German.) Gerhard Brunner and Artur Lösche. *Zeitschrift für angewandte Physik*, v. 7, no. 2, Feb. 1955, p. 67-71.

Resonance behavior of parallel oscillating circuits. Characteristic deviation of the time of excitation may be used in determining the quality of quartz used. Graphs, circuit diagram, photographs. 5 ref.

8657* Properties and Structure of Ultraporous Glasses. **Eigenschaften und Struktur ultra-mikroporöser Gläser.** (German.) Klaus Kühne. *Zeitschrift für physikalische Chemie (Leipzig)*, v. 204, nos. 1-2, Feb. 1955, p. 20-42.

Formation of porous glass of the SiO_2-B_2O_3-Na_2O system by dissociation and leaching with mineral acid; factors which influence the leaching rate; physical properties and lattice structure of the glass. Graphs, photographs. 5 ref.

8658* Viscosity of Some Glasses in the Softening and Fritting Temperature Ranges. **Viazkost' nekotorykh stekol v intervale temperatur razmiagcheniia i otzhiga. II.** Dependence of Viscosity of Glasses on Temperature. **Zavisimost' viazkosti stekol ot temperatury.** (Russian.) B. A. Pospelov. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 1, Jan. 1955, p. 70-75.

Activation energy of viscous flow; sodium-silicate glasses with oxide additions. Graphs, tables. 10 ref.

Books and Miscellaneous Publications

8659 Proceedings of the Third International Symposium on the Chemistry of Cement. 870 p. 1954. Cement and Concrete Assoc., London. (TP881 In8p3)

Twenty-two papers dealing with the various phases, structures, reactions, and uses of cements.

See also:
8974 (enamels from glass)
9021 (use of ceramic dielectrics)
9670 (approximate solutions to thermal shock problems)

CHEMICAL ENGINEERING

8660 Effect of Fluid Properties on Mass Transfer in the Gas Phase. E. J. Lynch and C. R. Wilke. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 9-19.

Investigation to clarify the role of the gas-film resistance by determining the effect of the properties on the rate of mass transfer in a packed tower. Tables, graphs, diagrams. 52 ref.

8661 Mass Transfer in Packed Beds. R. W. Fahien and J. M. Smith. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 28-37.

Investigation to determine diffusivities over a range of pipe and packing sizes, and to demonstrate the effect of radial position in the bed. Tables, graphs, diagrams, flowsheet. 14 ref.

8662 Enthalpy-Concentration Diagrams of Binary Aqueous Mixtures of Hydrazine, Sodium Carbonate, and Glycerine. Mack Tyner. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 87-92.

Outlines diagram preparation. Phase diagrams. 25 ref.

8663 Enrichment Calculations in Gaseous Diffusion: Large Separation Factor. Robert W. Naylor and Paul O. Backer. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 95-99.

Considers scheme to separate a H-N mixture. Table, graphs, diagram. 5 ref.

8664 Controlling Mechanism in the Aqueous Absorption of Nitrogen Oxides. M. S. Peters, C. P. Ross, and J. E. Klein. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 105-111.

Theory of absorption of nitrogen oxides agrees well with experiment; new concepts of absorption are presented. Table, graphs. 10 ref.

8665 Approximate Equations for Time of Batch Fractionation. A. I. Johnson, Chen-Jung Huang, and F. D. F. Talbot. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 111-117.

Calculations are reduced by use of pseudo-equilibrium curves. Tables, nomograms, graphs. 7 ref.

8666* Application of the Semiconductor Theory to Problems of the Heterogeneous Catalysis. **Anwendung der Halbleiter-Theorie auf Probleme der heterogenen Katalyse.** (German.) K. Hauffe. *Angewandte Chemie*, v. 67, no. 7, Apr. 7, 1955, p. 189-207.

Present state of research and mutual problems are reviewed. Nitrous oxide decomposition and CO oxidation are treated as examples. Table, graphs. 103 ref.

8667 The Drying of Iron Pyrites. F. Molyneux. *Chemical Age*, v. 72, Apr. 23, 1955, p. 939-942.

Measures to alleviate the S shortage in Great Britain required dry pyrites which were prepared in rotary louvre driers. Tables, graphs, diagrams.

8668 Solids-Gas Contacting. Raymond E. Vener and Lewis A. Robinson. *Chemical Engineering*, v. 62, May 1955, p. 163-172.

Eight systems and their applications. Tables, diagrams, photograph.

8669 What Not to Do With Dowtherm Systems. W. L. Badger. *Chemical Engineering*, v. 62, May 1955, p. 192-196.

Eleven cases of simple, but serious, mistakes are cited for the readers' profit. Diagrams, photographs.

8670 Chemical Engineering Fundamentals. Interpretation of Kinetic Data. II. Thomas E. Corrigan. *Chemical Engineering*, v. 62, May 1955, p. 203-206.

Methods which use reaction rates at finite values of conversion. Graphs. 3 ref.

8671 Vegetable Oil Refining. *Chemical Engineering*, v. 62, May 1955, p. 326-329.

Pictured flowsheets of caustic and modified soda ash processes. Flowsheets, photographs, diagram, table.

8672 Take a Look at Acrolein. *Chemical and Engineering News*, v. 33, May 9, 1955, p. 1964, 1966.

Surveys possibilities of this starting material.

8673 Performance Characteristics of Centrifugal Scrubbers. Glenn A. Johnson, Sheldon K. Friedlander, Richard Dennis, Melvin W. First, and Leslie Silverman. *Chemical Engineering Progress*, v. 51, Apr. 1955, p. 176-188.

Water wet aerosols and wet-wall scrubbers can improve recovery. Tables, graphs, diagrams, photographs. 22 ref.

8674 Compensation for Hydraulic Gradient in a Large Fractionator. J. A. May and Joseph C. Frank. *Chemical Engineering Progress*, v. 51, Apr. 1955, p. 189-193.

Case study of liquid-vapor behavior of a 10-ft. diameter column which developed a cyclic disturbance. Tables, graph, diagrams, photographs. 9 ref.

8675 A Versatile Multistage Extraction Unit. M. R. Fenske and R. B. Long. *Chemical Engineering Progress*, v. 51, Apr. 1955, p. 194-198.

A simplified, yet improved, extraction system. Tables, graphs, diagram, photographs. 9 ref.

8676 Thermodynamic Evaluation of Binary Vapour- liquid Equilibria. H. A. C. Thijssen. *Chemical Engineering Science*, v. 4, Apr. 1955, p. 75-80.

An exact graphical method based on boiling point composition data. Graphs. 11 ref.

8677 Rectification of Multicomponent Mixtures. Allen M. Eshaya. *Chemical Engineering Science*, v. 4 ,Apr. 1955, p. 85-96.

Simple and rapid tabular method of calculation with yields *n*th plate conditions without intermediate plate computation. Tables, graph. 12 ref.

8678* Centrifuging. I. New Machines for Industrial and Laboratory Use; Application in Oils and Fats, Soap and Sugar Industries. E. Broadwell. *Chemical & Process Engineering*, v. 36, Apr. 1955, p. 119-123.

Reviews work done in 1953 and 1954. Photographs. 145 ref. (To be continued.)

8679* Mechanical Seals. II. A Survey of a Present-Day Practice. B. G. Williams. *Chemical & Processing Engineering*, v. 36, Apr. 1955, p. 124-126.

Operation, maintenance, and applications. Graphs, diagram. 4 ref.

8680* Preparation of Pure Zirconia by Alkaline Melting of Zircon in the Solar Furnace. **Préparation de zircone pure par fusion alcaline du zircon au four solaire.** (French.) Félix Trombe and Marc Foëx. *Comptes rendus*, v. 240, no. 11, Mar. 14, 1955, p. 1225-1227.

7 ref.

8681* Ammonia Treatment of the Feed Water of High-Pressure Boilers. **Ammiachnaia obrabotka pitatel'noi vody kotlov vysokogo davleniia.** (Russian.) Z. I. Zaitseva. *Energetik*, v. 3, no. 3, Mar. 1955, p. 6-8.

Describes method for degassing (CO_2) in the feed water. Diagrams.

Chemical Engineering

8682* Chemical Plant for the Pharmaceutical and Fine Chemical Industry. S. C. M. Salter. *Export Review*, v. 15, Apr. 1955, p. 34, 37-40.

Reviews developments in several general operations. Photographs.

8683* A New Ammonia-Urea Plant. Mitchell F. Keamy, Jr. *Heat Engineering*, v. 30, Mar.-Apr. 1955, p. 22-29.

Plant, combining four outstanding processes and advanced technology, to produce ammonia and urea. Photographs, diagrams, tables.

8684 Salt Manufacture. Albert S. Hester and Horace W. Diamond. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 672-683.

The Morton Salt Co., Manistee, Mich., plant, with a capacity of over 1,000 tons per day, exemplifies chemical engineering efficiency in a competitive field. Tables, graph, diagrams, flowsheets, photographs, micrograph. 33 ref.

8685 Chemical Feeding and Proportioning Equipment. Russell W. Henke. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 684-695.

Tabulates types of equipment available and recommends construction for several hundred materials. Tables, diagrams, photographs.

8686 Dispersion Studies. Correlation of Roll Mill Variables. Floating Roll Mill. Correlation of Floating Mill Variables. Louis Maus, Jr., William C. Walker, Albert C. Zettlemoyer, Ernest Gamble, and James H. Taylor. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 696-706.

Analyzes two- and three-roll mill operation and shows that the floating-roll mill decimates 80 possible maladjustments and is 15% more efficient. Tables, graph, diagrams. 11 ref.

8687 Design Equations for Continuous Stirred-Tank Reactors. Transients of Second-Order Chemical Reactions. F. S. Acton and L. Lapidus. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 706-710.

Derives equations for transient effluent concentration with an IBM computer. Table, graphs. 12 ref.

8688 Fractionating Efficiency of Coke Packings. Fumitake Yoshida and Tetsushi Koyanagi. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 711-714.

While having a cost advantage and comparing well with Raschig rings, coke has higher holdup values. Table, graphs. 13 ref.

8689 Fractionation of Mixed Aromatics From Udex Extraction. E. R. Fenske and D. B. Broughton. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 714-717.

Separation of 99.9% benzene, toluene, and xylene from mixed stocks is possible. Graphs, flowsheet. 1 ref.

8690 Catalytic Processing of Gasoline Fractions. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 718-773.

Symposium of ten papers presented at the 126th Meeting of the American Chemical Society, New York, N. Y., by the Division of Petroleum Chemistry. Includes hydroforming, houdriforming, use of nickel oxide-silica-alumina, tungsten nickel sulfide, catalysts, BF_3, and aromatic isomerization. Pictorial aids and references.

8691 Chemical Processes. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 774-802.

Consists of seven papers pr;esented at the first symposium of this subdivision of the Division of Industrial and Engineering Chemistry at the 126th Meeting of the American Chemical Society, New York, N. Y. Papers cover vapor-phase air oxidation of cyclohexane; oxidation of cyclohexane to adipic acid with nitrogen dioxide; mononitration of *o*- and *p*-nitrotoluene; synthesis of pyridines; continuous esterification of citric and aconitic acid; and pyridine-*N*-oxide.

8692 Loading Velocities in Packed Columns. F. H. Garner, S. R. M. Ellis, and W. H. Granville. *Journal of Applied Chemistry*, v. 5, Mar. 1955, p. 105-109.

Prediction is based on an equation of six elements. Graphs. 13 ref.

8693* Distillation Column With Rotating Blade. (French and English.) J. Rousseau. *Laboratories*, 1955, no. 12, p. 21-26.

Includes graphs, tables, photographs.

8694* Possibility of Quantitative Isolation of Germanium Tetrabromide Using Ether. **Über die quantitative Extrahierbarkeit des Germaniumtetrabromids mit Äther. I.** (German.) Inge-Maria Ladenbauer, O. Slama, and F. Hecht. *Mikrochimica Acta*, 1955, no. 1, p. 118-122.

Method based on the continuous extraction of $GeBr_4$ from 6 *N* hydrobromic acid. Tables. 7 ref.

8695 Perforated Plates Versus Bubble Caps in Absorber Service. R. G. Kelley. *Oil and Gas Journal*, v. 53, Apr. 18, 1955, p. 128-132.

Data presented show systems have identical efficiency; "fringe" benefits of plates are cited. Table, graphs, diagram. 7 ref.

8696 Equilibrium Ratio Charts for Hydrocarbon Systems. Elliott I. Organick. *Oil and Gas Journal*, v. 53, Apr. 18, 1955, p. 136-138.

Contents and example (for propane at 1000 psi.a.) of data in a forthcoming publication. Table, graph.

8697 New Dry-Furnace Carbon-Black Process. W. H. Balka. *Oil and Gas Journal*, v. 54, May 9, 1955, p. 120-122.

Basic features of the Lynn Furmatic process; highlights on carbon black and its manufacture. Flowsheet, tables.

8698* The Rate of Ammonia Oxidation. **O szybkości reakcji utleniania amoniaku. I.** Oxidation of Ammonia Under Normal Pressure. **Utlenianie amoniaku pod ciśnieniem normalnym. II.** Oxidation of Ammonia Under Increased Pressure and a Discussion of the Results. **Utlenianie amoniaku pod ciśnieniem zwiększonym i dyskusja wyników.** (Czech.) S. Bretsznajder. *Przemysł Chemiczny*, v. 11, no. 1, Jan. 1955, p. 13-20.

Effect of catalyst layer on the oxidation of ammonia under pressure.

8699* Applied Chemical Kinetics. **Cinétique chimique appliquée. XI.** Heterogeneous Catalysis. **La catalyse hétérogène.** (French.) J. C. Jungers and J. C. Balacéanu. *Revue de l'institut français du pétrole et Annales des combustibles liquides*, v. 10, no. 2, Feb. 1955, p. 128-150.

Kinetics studies of catalytic transformations. Graphs, diagrams, tables. (To be continued.)

8700* Investigation of Rectifying Action of Laboratory Columns Filled With Porcelain Rings. **Issledovaniie rektifitsiruiushchego deistviia laboratornykh kolonn, napolnennykh farforovymi kol'tsami.** (Russian.) N. I. Gel'perin and K. V. Vil'shau. *Zhurnal Prikladnoi Khimii*, v. 28, no. 3, Mar. 1955, p. 254-261.

Rectification of binary mixture of benzene-dichloro-ethane. Geometrical parameters of column packing. Tables, graphs, diagram.

Books and Miscellaneous Publications

8701 Saline Water Conversion. Third Annual Report. U. S. Secretary of Interior. 125 p. 1955. U. S. Department of Interior, Office of the Secretary, Washington, D. C. (QH88 Un3.4a)

Progress on federally sponsored scientific research and development; coordination and exchange of information on phases of saline water conversion research; need for further legislation, as required by statute.

See also:

8817 (glycerine synthesis)
8831 (coke formation on cracking catalyst)
9141 (fluid coking)
9152 (gasifications of carbon)
9195 (feedwater treatment)
9759 (recovery of nitrogen oxides)
9774 (waste examinations)

CHEMISTRY—ANALYTICAL AND INORGANIC

8702* Hydrogen Peroxide Stabilised by Titanium(IV) Ions as a Titrimetric Measuring Solution. Determination of Cerium(IV) Ions by Direct Titration. (English.) M. T. Beck.

Acta Chimica Academiae Scientiarum Hungaricae, v. 5, nos. 3-4, 1955, p. 209-214.

Includes graphs, tables. 3 ref.

8703* Use of Ultraviolet Absorption Spectra of Saturated Vapour Mixtures for the Determination of the Chemical Composition of the Solution. Determination of Naphthalene and Tetralin in the Presence of Each Other. (English.) Gy. Varsányi. *Acta Chimica Academiae Scientiarum Hungaricae*, v. 5, nos. 3-4, 1955, p. 255-266.

Includes spectra, tables.

8704 Polarography of the Noble Metals. R. B. Simpson, R. L. Evans, and H. A. Saroff. *American Chemical Society, Journal*, v. 77, Mar. 20, 1955, p. 1438-1440.

Demonstrates feasibility without complex ion formation. Table, polarograms. 13 ref.

8705* The Standardization of Ammonium Vanadate Solutions With Sodium Oxalate. (English.) D. M. West and D. A. Skoog. *Analytica Chimica Acta*, v. 12, no. 4, Apr. 1955, p. 301-307.

Sodium oxalate is found to be a suitable and convenient primary standard for solutions of quinquevalent vanadium. Tables. 7 ref.

8706* Complexometric Titration of Aluminium. (English.) Erkki Wänninen and Anders Ringbom. *Analytica Chimica Acta*, v. 12, no. 4, Apr. 1955, p. 308-318.

Includes graphs, tables. 17 ref.

8707* The Oxidation of Thallium(I) by Selenious Acid. (English.) G. S. Deshmukh. *Analytica Chimica Acta*, v. 12, no. 4, Apr. 1955, p. 319-322.

Includes table. 11 ref.

8708* A Relation Between R_f Values of Unidimensional and Circular Paper Chromatography. (English.) N. C. Ganguli. *Analytica Chimica Acta*, v. 12, no. 4, Apr. 1955, p. 335-341.

Includes tables. 12 ref.

8709* Barium-Strontium Separation by Cellulose Chromatography. **Séparation baryum-strontium par chromatographie sur cellulose. II.** Powdered Cellulose Chromatography. **Chromatographie sur poudre de cellulose.** (French.) J. Fouarge. *Analytica Chimica Acta*, v. 12, no. 4, Apr. 1955, p. 342-350.

Includes graphs.

8710* A Micro-Heterometric Determination of Traces of Iron (III) in Alloys and Salts With α-Nitroso β-Naphthol. (English.) M. Bobtelsky and E. Jungreis. *Analytica Chimica Acta*, v. 12, no. 4, Apr. 1955, p. 351-357.

Includes tables, graphs. 31 ref.

8711 Review of Industrial Application of Analysis, Control, and Instrumentation. *Analytical Chemistry*, v. 27, Apr. 1955, pt. 2, p. 574-690.

This periodic feature is divided into 14 sections, each being written by specialists. Heavily referenced.

8712* Accurate Rapid Microanalysis of Gases. **Genaue Mikro-Schnellanalyse von Gasen.** (German.) Heinrich Feichtinger. *Archiv für das Eisenhüttenwesen*, v. 26, no. 3, Mar. 1955, p. 127-129; disc., p. 129-130.

Apparatus for analyzing the gas mixtures resulting from the hot vacuum extraction of metals. Diagram, tables, photographs.

8713* Determination of Boron in Steel. **Die Bestimmung des Bors im Stahl.** (German.) Harold George Short. *Archiv für das Eisenhüttenwesen*, v. 26, no. 4, Apr. 1955, p. 209-212.

Outlines quantitative, colorimetric, and spectrometric analyses. Tables, diagrams, graph, structural formulas. 3 ref.

8714* Paper Chromatographic Separation of Simple Phenols. **Zur papierchromatographischen Trennung von einfachen Phenolen.** (German.) D. Schleede. *Brennstoff-Chemie*, v. 36, nos. 5-6, Mar. 9, 1955, p. 78-79.

Description of the method and the technique of its application. Tables, chromatograms. 7 ref.

8715 Studies of the Potentiometric Titration of Boric Acid With Alkali. Hideo Tanabe and Kioko Hidaka. *Henry Brutcher, Translation No.* 2908, 7 p. (From *Annual Reports Takeda Research Laboratory*, v. 9, 1950, p. 68-72.) Henry Brutcher, Altadena, Calif.

Includes tables, diagram.

8716 New Sensitive Test Reagent for Magnesium. Kh. N. Pochinok and V. Ya. Pochinok. *Henry Brutcher Translation No.* 2933, 9 p. (From *Zhurnal Analiticheskoi Khimii*, v. 4, no. 4, 1949, p. 244-247.) Henry Brutcher, Altadena, Calif.

Includes tables.

8717 The Use of the Thermobalance in Analytical Chemistry. Fernand Claisse, Florian East, and Frederic Abesque. *Canadian Department of Mines, P.R. No.* 305, 1954, 19 p. (TN27 Q3.54p)

Describes the Chevenard-type thermobalance which records wt. vs. temperature of a reaction system. Diagram, graphs.

8718 Some Complex Oxyfluorides of Septavalent Rhenium. R. D. Peacock. *Chemical Society, Journal*, 1955, Mar., p. 602-603.

Preparation of compounds of the types $KReO_2F_4$, $AgReO_2F_4$ and $Ca(ReO_2F_4)_2$. 6 ref.

8719* Consideration of Atmospheric Lift in Analytical Weighing. **Die Berücksichtigung des Luftauftriebes bei analytischen Wägungen.** (German.) Hans Ulbricht. *Chemiker-Zeitung*, v. 79, no. 7, Apr. 12, 1955, p. 201-205.

Includes graphs, tables. 2 ref.

8720 A Spray Reagent for Identification of Organic Acids. S. M. Martin. *Chemistry & Industry*, 1955, no. 16, Apr. 16, p. 427-428.

Simple reagents for chromatographic identification of 18 acids. Table. 2 ref.

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Principles and performance of gas analyzers. Diagrams, graphs.

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Includes table. 3 ref.

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X-ray analysis; solubility. Tables. 3 ref.

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Used to advantage in studies with Hg, Au, Ag, Cu, Pb, Tl, and Cd. Tables, graphs, polarograms. 19 ref.

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Outline of three separation techniques. Tables. 11 ref.

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Includes tables, graphs, diagrams. 3 ref.

Chemistry—Analytical and Inorganic

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Includes graphs, diagram. 11 ref.

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Reviews Na fusion analysis of organics. 37 ref.

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Establishes conditions for determination. Tables, polarograms. 10 ref.

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Asphalt is fractionated into four distinct groups. Tables, diagrams. 9 ref.

8733* Quantitative Determination of an Added Component of Rubber. **Über die quantitative Bestimmung von Kautschuk-Hilfsstoffen. III.** (German.) Walter Scheele and Christa Ilschner-Gensch. *Kautschuk und Gummi*, v. 8, no. 3, Mar. 1955, p. 55WT-59WT.

Determination of S, mercaptobenzothiazole, thiocyanate, and fillers. Methods and practice. Tables, graphs. 7 ref.

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Primary reaction products of alkaline or acid phenol-formaldehyde condensation are separated and identified and the technique is applicable to products with as many as three phenol residues per mol. Photographs, structural formulas, table. 20 ref.

8735* Dilution Paperchromatography and Its Application to the Analysis of Phenol-Formaldehyde Resins. **Higításos papírkromatográfia és alkalmazása fenol—formaldehid gyanták vizsgálatára.** (Hungarian.) Ernő Zichy. *Magyar Kémiai Folyóirat*, v. 61, no. 3, Mar. 1955, p. 91-92.

Includes graph. 4 ref.

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Includes table. 2 ref.

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Description of tested methods are presented. Diagrams, graph, tables. 17 ref.

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Evaluation and improvement of test procedure for determining C_3+ and C_4+ content of natural gas. Tables, graph, diagram, nomogram.

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Investigation to study the efficacy of new lamps in exciting the fainter lines of Ti 1 and to determine how many of them are ordinarily masked by the oxide bands. Table. 6 ref.

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The use of thermal conductivity cell and "electronic brain" permits greatly improved accuracy and higher speed in analysis. Diagrams, photographs, tables. 20 ref.

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Procedure and data for the rapid determination of Cu in cyanide and acid Cu plating baths. Tables, graphs. 3 ref.

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Amounts of Al in steel determined by use of aluminon and eriochromecyanine. Graphs, tables. 32 ref.

8744* Quantitative Analysis of Minerals in Rocks by X-Ray Diffraction. **Analyse quantitative des minéraux dans les roches par la diffraction des rayons X.** (French.) C. L. Alexanian. *Revue de l'institut français du pétrole et Annales des combustibles liquides*, v. 10, no. 2, Feb. 1955, p. 115-127 + 2 plates.

Satisfactory determination of minerals in fine-grained rocks by Geiger-Muller counter diffractometers. Photographs, tables, graphs. 14 ref.

8745* Comparison of the Analytical and Spectral Methods of the Determination of the Total Al in Steels. **Comparaison des méthodes analytiques et spectrales du dosage de l'aluminium total dans les aciers.** (French.) M. Lacomble and L. Dor. *Revue de métallurgie*, v. 52, no. 3, Mar. 1955, p. 190-200; disc., p. 200.

Test made to determine most accurate method of analysis. Diagrams, tables, graphs. 7 ref.

8746* Some Remarks Upon the Determination of the O in Ti. **Quelques remarques sur le dosage de l'oxygène dans le titane.** (French.) J. Orsag. *Revue de métallurgie*, v. 52, no. 3, Mar. 1955, p. 237-239.

Methods for determination; merits of one process over another. Diagram, photograph.

8747 Continuous Ascending Chromatography—New Technique. Henry Fischbach and Joseph Levine. *Science*, v. 121, Apr. 22, 1955, p. 602-603.

A cell atop the strip permits solvent evaporation. Photograph. 2 ref.

8748 Explosion Limits of the Hydrogen-Oxygen-Water System at Elevated Temperatures. H. A. Pray, C. E. Schweickert, and E. F. Stephan. *U. S. Atomic Energy Commission, BMI-705*, 1951, 28 p. (UF767 U3b)

Data are given on the theoretical pressures due to the reaction in saturated water vapor of stoichiometric mixtures of H and O at partial pressures up to 100 psi.a. and initial temperatures up to 650 F. By allowing for the effects of violent explosive reactions, these data are translated into design pressures. Tables, graphs, diagrams. 8 ref.

8749* Determination of a Very Small Amount of Chromium in a Hydrochloric Acid Solution. **Bestimmungr kleinster Chromgehalte aus salzsaurer Lösung.** (German.) W. Oelschläger. *Zeitschrift für analytische Chemie*, v. 145, no. 2, 1955, p. 81-88.

Method; technique of operation; exactitude of determination. Tables. 8 ref.

8750* Iodometric Determination of Arsenic in Arsenic-Organic Compounds Using Centigram Weighed Portions. **Zur jodometrischen Arsenbestimmung in arsenorganischen Verbindungen mit Centigramm-Einwaagen. II.** Determination of Arsenic in Halogen Containing Compounds; Determination of Antimony. **Bestimmung von Arsen in halogenhaltigen Verbindungen; Bestimmung von Antimon.** (German.) G. Bähr, Herbert Bieling, and Karl-Heinz Thiele. *Zeitschrift für analytische Chemie*, v. 145, no. 2, 1955, p. 105-109.

Includes tables.

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Includes table. 8 ref.

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Includes graphs, spectrograms, tables. 8 ref.

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8755* Problem of the Determination of Cesium in the Form of Cesium-Bismuth Iodide. **K voprosu ob opredelenii tseziia v vide tseziivismutiodida.** (Russian.) V. E. Pluishchev and B. G. Korshunov. *Zhurnal Analiticheskoi Khimii*, v. 10, no. 2, Mar.-Apr. 1955, p. 119-123.

Includes tables. 17 ref.

Books and Miscellaneous Publications

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Experimental techniques, interpretation of data, and practical uses of techniques in different fields.

See also:

9140 (analysis of fuels)
9143 (infra-red spectra of coal)
9144 (infra-red spectra of coal)
9612 (determination of radioactive carbon)
9696 (X-ray diffraction for identification of materials)
9774 (waste analysis)

CHEMISTRY—ORGANIC

8757* **The Complex Formation Between Iron(III) Ion and Some Phenols. III. Salicylaldehyde, *o*-Hydroxyacetophenone, Salicylamide and Methyl Salicylate. IV. The Acidity Constant of the Phenolic Group.** (English.) Allan Ågren. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 39-56.

Determined at 25 C. Phenolic group dissociation constant measured by ultra-violet photometry. Tables, graphs, ultra-violet spectra. 34 ref.

8758* **The Alkylation of Lignin With Alcoholic Hydrochloric Acid.** (English.) Erich Adler and Josef Gierer. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 84-93.

"Native" and $NaBH_4$ reduced lignins are treated. Table, graph, ultra-violet and infra-red spectra. 21 ref.

8759* **The Catalatic Decomposition of Hydrogen Peroxide and Its Retardation by Azide.** (English.) Lis Skovsted. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 94-97.

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8760* **The Crystal Structures of the Isomeric Squalene Hexahydrochlorides.** (English.) Harald Sörum and Johannes Dale. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 141-150.

Proof of structure is proven by X-ray and infra-red absorption data. Tables, diagrams, infra-red spectra. 8 ref.

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Polymers form at room temperature by reaction with diamines. Table. 15 ref.

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Esters cleave into three parts. Tables. 12 ref.

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Study of reactions of doubly reactive alkylbenzenes. Tables. 19 ref.

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Studies on α-, β-, and γ-carotene, zeaxanthin, lycopene, dimethylcrocetin, and methylbixin stereo pairs. Infra-red spectra. 27 ref.

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Shows random behavior when heated with anhydrous $AlCl_3$. 17 ref.

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Eight compounds were subjected to this treatment. Table. 5 ref.

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Seven cyclo-compounds were synthesized and studied. Tables. 28 ref.

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An autocatalyzed liquid phase reaction with O_2 and a photo-initiated liquid phase oxidation. Tables, graphs. 16 ref.

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Eight deuterium labeled aldehydes were studied from ph 5 to 13. Oxygen-18 labeled $KMnO_4$ is also used. Tables, graphs. 26 ref.

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Synthesis and characterization. Table, infra-red spectra. 9 ref.

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Synthesis via 2,4-hexadien-1-ol, and reactions. 14 ref.

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Above examined with HF and HF plus BF_3 catalysts. Hypothesis is presented for differences. Table. 6 ref.

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Above done by catalytic hydrogenolysis of their mono- ethylene dithioketals. 11 ref.

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Oil was proved and synthesized from *cis*- and *trans*-crotyl isothiocyanates. 75 ref.

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Benzyl-, *n*-butyl-, and *n*-hexylhydrazines prepared. Spectra of alkylsydnones given. Infra-red spectra. 26 ref.

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Methyl affinities of 16 compounds were determined. Tables, graphs. 14 ref.

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Includes tables, graph. 46 ref.

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Made by reaction of acid chlorides with AgCN. Table.

8794 Preparation of Substituted Quaternary Ammonium Fluoborates. Charles M. Wheeler, Jr. and Richard A. Sandstedt. *American Chemical Society, Journal*, v. 77, Apr. 5, 1955, p. 2025-2026.

Tetraethyl-, tetra-*n*-propyl-, and tetra-*n*-butyl-ammonium fluoborates are prepared. 4 ref.

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Preparation, properties, and isolation; cake baking utility is minimal. Tables, graphs, flow chart. 11 ref.

8796 The Suppression of Soil Redeposition. J. Ross, P. T. Vitale, and A. M. Schwartz. *American Oil Chemists' Society, Journal*, v. 32, Apr. 1955, p. 200-204.

Calcium chelating agents and small amounts of CMC decrease Aqua-dag redeposition. Graphs. 6 ref.

8797 Reactions of Fatty Materials With Oxygen. XVIII. Catalytic Hydrogenation of Autoxidized Methyl Oleate and Oleic Acid. Preparation of Monohydroxystearic Acids. Joseph E. Coleman and Daniel Swern. *American Oil Chemists' Society, Journal*, v. 32, Apr. 1955, p. 221-224.

Autoxidation beyond peak peroxide values and hydrogenation gas mixed monohydroxy stearic acids. Tables. 30 ref.

8798 Urea Adducts of Mono- and Diesters of Fatty Acids. J. S. Heckles and L. H. Dunlap. *American Oil Chemists' Society, Journal*, v. 32, Apr. 1955, p. 224-229.

Urea forms complexes with separate stearates and oleates from linoleates, and performs better with monoglycerides than with diglycerides. Graphs, photographs. 9 ref.

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Oil-, vinyl-, and styrene-modified alkyds. 11 ref.

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Explained as an autoxidation process. Graphs. 16 ref.

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Compared with propene; absorption in acids. Graphs. 6 ref.

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Methyl, ethyl, *n*-propyl, and *n*-butyl alkoxides were prepared and studied. Tables, diagram. 3 ref.

8810 The Structure of Acyl Nitrates. H. Burton and P. F. G. Praill. *Chemical Society, Journal*, 1955, Mar., p. 729-731.

Solvent for *in situ* reactions is methyl cyanide. Table. 7 ref.

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NN-dialkylhydroxylamines made from corresponding amines and by other methods. 18 ref.

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Made *n*-butyl difluoroboronite, $C_4H_9O \cdot BF_2$. 17 ref.

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Preparation of 34 compounds for testing as trypanocidal agents. Tables. 34 ref.

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Includes table, diagrams, ultra-violet spectra. 74 ref.

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Includes tables, diagram, infra-red and ultra-violet spectral data. 98 ref.

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Mixed system permits mild pyrolysis without serious interaction. 4 ref.

8817 Glycerine Payoff in Propylene Parlay. *Chemical Week*, v. 76, May 7, 1955, p. 72, 74, 76.

Shell's new process promises acetone as a by-product from a cheaper glycerol process. Flowsheet.

8818* Production and Properties of Phosphoric Acid-[β-Chlor-Ethyl Ester]-Phenyl Ester Chlorides. **Darstellung und Eigenschaften des Phosphorsäure-[β-chlor-äthylester]-phenylester-chlorids.** (German.) Ludwig Acker. *Chemische Berichte*, v. 88, no. 3, 1955, p. 376-378.

Physical and chemical constants of obtained compounds. 3 ref.

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Includes tables, diagrams. 12 ref.

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Spectral analysis reveals that sulfinic acids, in polar and nonpolar solvents, have a R-SO(OH) structure. Tables, diagrams. 14 ref.

8821* The Autoxidation of Ketones. **Über die Autoxydation von Ketonen. II.** The Decomposition of α-Hydroperoxy-Ketones. **Die Zersetzung von α-Hydroperoxyketonen.** (German.) Wilhelm Pritzkow. *Chemische Berichte*, v. 88, no. 4, 1955, p. 572-581.

Includes graphs, tables. 30 ref.

8822 The Synthesis of 1:2-Binaphthylene. M. P. Cava and J. F. Stucker. *Chemistry & Industry*, 1955, no. 16, Apr. 16, p. 446.

By pyrolysis of 2,2'-diiodo-1,1'-binaphthyl with Cu_2O. 4 ref.

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Measurements of the ionization constants of phthalimide and its substitution derivatives. Tables.

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Includes tables. 6 ref.

8825* Dihydroxy-1,4-Anthracene and Corresponding Alkyl Derivatives. Their Photo-Oxidation and Photodimerization. **Dihydroxy-1.4 anthracène et dérivés alcoylés correspondants. Leur photooxydation et leur photodimérisation.** (French.) André Étienne and Yves Lepage. *Comptes rendus*, v. 240, no. 11, Mar. 14, 1955, p. 1233-1235.

5 ref.

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Includes graphs. 10 ref.

8827* Synthesis and Properties of Monochloro-Derivatives of Ethylsilane Chlorides. **Sintez i svoistva monokhlorproizvodnykh etilsilankhloridov.** (Russian.) A. D. Petrov, V. A. Ponomarenko, L. L. Mkhitarian, and A. D. Snegova. *Doklady Akademii Nauk SSSR*, v. 100, no. 6, Feb. 21, 1955, p. 1107-1110.

Includes table, graphs. 17 ref.

8828* Synthesis of Alkyl(aryl)Alkoxysilanes. **Sintez alkil-(aril)alkoksisilanov.** (Russian.) K. A. Andrianov and L. V. Gornets. *Doklady Akademii Nauk SSSR*, v. 101, no. 2, Mar. 11, 1955, p. 259-261.

Compounds synthesized include methyltriisoamyloxysilane, phenyltrioctoxysilane, etc. Table. 9 ref.

8829* Catalytic Synthesis of Cyclopentylamine. **Kataliticheskii sintez tsiklopentilamina.** (Russian.) M. A. Popov and N. I. Shuikin. *Doklady Akademii Nauk SSSR*, v. 101, no. 2, Mar. 11, 1955, p. 273-276.

Includes reduction amination of cyclopentanone. Table. 5 ref.

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Discussion of the sense of smell. 7 ref. (To be continued.)

8831 Radiotracer Study of Coke Formation on Cracking Catalyst. Robert E. McMahon. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 844-845.

Study of *n*-heptane-4C^{14}, *n*-octane-1 C^{14}, and 1-octene-1 C^{14} during cracking shows no fractionation of radioactivity. Tables, 9 ref.

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Develops a formula which eliminates unsatisfactory compounds and shows superior solvents. Study predicted hexamethylphosphoramide. Tables, graphs. 10 ref.

8833 Organo-Phosphorus Compounds. I. Interaction of Organic Phosphorohalogenides With Solid Alkalis: A New Synthesis of Schradan. M. Pianka. *Journal of Applied Chemistry*, v. 5, Mar. 1955, p. 109-120.

Schradam is prepared from tetramethylophosphorodiamidic chloride; similar reactions are reported. Table, graph. 16 ref.

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Static adsorption isotherms in Darco G-60 charcoal are made for several acids; palmitic and stearic acids are separated. Tables, graphs, diagram. 9 ref.

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Stearic circumstances at 20 C and below considered; some dimetalation occurs. Tables. 18 ref.

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Phenolics show fungicidal properties. 6 ref.

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Includes tables, graph, diagram, ultra-violet spectra. 30 ref.

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Historical review of wood chemistry; cellulose, starch, and lignin. Graph, models. 9 ref.

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Studied by chemical and infra-red analyses, chlorination in total darkness proceeds by a substitution mechanism. Tables, graphs, infra-red spectra. 26 ref.

8841* Additions of Sodium-Trityl to Butadiene in the Presence of Triphenyl Boron. **Über die Addition des Tritylnatriums an Butadiene in Gegenwart von Triphenyl-bor.** (German.) Georg Wittig and Hans Schloeder. *Justus Liebigs Annalen der Chemie*, v. 592, no. 1, 1955, p. 38-53.

Theoretical consideration. Experimental results. Physical and chemical constants of obtained compounds. 24 ref.

8842* The Nature of Wool Wax and Its Economic Future. D. H. S. Horn. *Manufacturing Chemist*, v. 26, Apr. 1955, p. 149-153.

Research for possible uses for this by-product in pharmaceuticals, plastics, and greases. Graph, photograph. 44 ref.

8843* Organic Synthesis in Non-Aqueous Solutions. II. The Alkylation of Glycine Derivatives in Liquid Ammonia. Benzylation and Methylation of Glycine Anhydride in Liquid Ammonia. (English.) Kôtarô Shimo and Ryûzô Asami. *Science Reports of the Research Institutes, Tôhoku University*, ser. A, v. 6, no. 6, Dec. 1954, p. 623-635.

Benzyl chloride and methyl iodide are used. Table, diagrams. 8 ref.

8844* Influence of the Structure of the Oxime Molecule on Properties of Compounds With Metals. **Vliianie stroeniia molekuly oksima na svoistva soedinenii s metallami.** (Russian.) V. M. Peshkova. *Zhurnal Analiticheskoi Khimii*, v. 10, no. 2, Mar.-Apr. 1955, p. 86-93.

Includes spectra, graphs, tables. 4 ref.

8845* Mutual Solubility in Ternary Liquid Systems. **Vzaimnaia rastvorimost' v troinykh zhidkikh sistemakh. I.** Water-Isopropyl Alcohol-Dichlorethane System. **Sistema voda-izopropilovyi spirt-dikhloretan.** (Russian.) N. A. Izmailov and A. K. Franke. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 1, Jan. 1955, p. 120-127.

Includes tables, graphs. 11 ref.

8846* Investigation of Active Centers of Hydrogenation of Ethylene Hydrocarbons. **Issledovanie aktivnykh tsentrov gidrirovaniia etilenovykh uglevodorodov. I-II.** (Russian.) A. N. Mal'tsev and N. I. Kobozev. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 1, Jan. 1955, p. 142-158; no. 2, Feb. 1955, p. 291-304.

Kinetic measurements of ethylene hydrogenation on platinized silicagel at 100 C. X-ray study of Pt adsorption catalysts. Graphs, tables, diagrams. 42 ref.

8847* Thermal Decomposition of Benzoyl Peroxide in a Mixture of Solvents—Benzene and Methyl Alcohol, Carbon Tetrachloride and Isopropyl Alcohol. **Termicheskoe razlozhenie perekisi benzoila v smesi rastvoritelei—benzol i metilovyi spirt, chetyrekhkhloristyi uglerod i izopropilovyi spirt.** (Russian.) B. N. Moryganov. *Zhurnal Obshchei Khimii*, v. 25, no. 3, Mar. 1955, p. 493-495.

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Includes structural formulas. 2 ref.

8849* Catalytic Conversion of Ethyl Alcohol to Acetone and Methyl-Propyl Ketone. **Kataliticheskoe prevrashchenie etilovogo spirta v atseton i metilpropilketon.** (Russian.) B. A. Bolotov, B. N. Dolgov, and P. M. Adrov. *Zhurnal Prikladnoi Khimii*, v. 28, no. 3, Mar. 1955, p. 299-306.

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Chemistry of polyamides and their use as a raw material for plastics and synthetic fibers.

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American developments from the start in World War I through the assimilation of data obtained as a result of World War II.

8852 Techniques of Organic Chemistry. v. VII. Organic Solvents. Arnold Weissberger and Eric S. Proskauer. 2nd Ed. (Rev. by John A. Riddick and Emory E. Toops, Jr.) 552 p. 1955. Interscience Publishers, New York. (TP247.5 R4302)

Physical properties, methods of purification, and reaction mechanisms.

See also:

8584 (piperidine-carboxylic acid isolated from plants)
8866 (steric effects in displacement reactions)
8898 (protein solutions)
8935 (polymerization of drying oils)
9601 (radiation effects on organic material)
9709 (polymers from oxides of carbon)
9714 (emulsifiers for polymerization)
9741 (isocyanate resins)

CHEMISTRY—PHYSICAL

8853* Studies on Arsenic Trichloride as a Solvent. II. On the Constitution of Solutions in Arsenic Trichloride. III. Potentiometric Acid-Base Titrations in $AsCl_3$. (English.) Lars Henrik Andersson and Ingvar Lindqvist. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 73-83.

Suggests studies of $AsCl_3$ solutions for similarities with aqueous systems. Tables, graphs, diagrams. 24 ref.

8854* On Ion Exchange Equilibria. III. An Investigation of Some Empirical Equations. (English.) Erik Högfeldt. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 151-165.

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8855* Semiempirical Method for Calculating Thermodynamic Properties. The Thermodynamic Data of 1,2,3,4-Tetrahydronaphthalene. (English.) A. Székely. *Acta Chimica Academiae Scientiarum Hungaricae*, v. 5, nos. 3-4, 1955, p. 317-339.

Includes tables, structural formulas, graph. 25 ref.

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Studied at 25, 15, and O C; some discontinuities are noted. Graphs. 14 ref.

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Determined calorimetrically in O at an initial temperature of 24.6 C. Table. 4 ref.

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Form of thermomagnetic curves is related to particle size effects. Tables, graphs. 12 ref.

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Nernst equation, Ohm's and Faraday's laws apply to anodic decomposition. Tables, graphs, polarograms. 10 ref.

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Includes tables, graphs, diagram. 70 ref.

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Measured at pressures up to 4600 cm. Tables, graphs. 13 ref.

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Chemistry of TiF_3; verified X-ray powder diffraction data for TiF_3, TiF_4, and $TiOF_2$. Table. 5 ref.

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A sulfonated polystyrene resin is evaluated by exchange isotherms at several temperatures. Tables, graphs. 14 ref.

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Acetone, acetaldehyde, di*iso*propyl ketone, chloroform, and acetonitrile are studied in 14 polar and non-polar solvents. Tables, graphs, infra-red spectra. 32 ref.

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Theoretical developments of 21 compounds are studied. Tables, diagrams. 45 ref.

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Properties of those two types "H" and "L" of C are compared. Tables, graphs, diagrams. 54 ref.

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Thermodynamic behavior of molten salt mixtures; heat of mixing; activity of salt component of a perfect ionic solution. 3 ref.

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Applied to absorption of SO_2 by water. Tables, graphs, diagrams. 23 ref.

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8916* Chemical Structure and Physico-Chemical Properties of Molecules. Khimicheskoe stroenie i fiziko-khimicheskie svoistva molekul. (Russian.) V. M. Tatevskii and Iu. A. Pentin. *Moskovskogo Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk*, v. 10, no. 2, Feb. 1955, p. 21-32 + 2 plates.

Valence angles in mol.; concept of valence states of atoms; types of chemical bonds; influence of atoms not directly participating in chemical bond. Tables, graphs.

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Equally applicable to carbo- and heterocyclical structures. Renders possible consistent nomenclature of polycyclic compounds. Table, diagrams.

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Includes graphs. 7 ref.

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Includes graphs, tables, polarograms. 44 ref.

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Includes graphs. 3 ref.

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Includes graphs. 4 ref.

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Methods and apparatus for determining heat capacity of the triethylamine-water system. Tables, graphs, diagrams. 16 ref.

8929* Oxidation of Sulfur by Nitrose. **Okislenie sery nitrozy.** (Russian.) M. E. Pozin and Ia. Ia. Vosol'sobe. *Zhurnal Prikladnoi Khimii*, v. 28, no. 3, Mar. 1955, p. 229-236.

Includes diagram, tables, graphs. 2 ref.

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System of differential equations, boundary conditions, etc. 7 ref.

Books and Miscellaneous Publications

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Materials and methods for bringing into solution substances that are otherwise insoluble in a given medium.

See also:

8731 (Isomeric inorganic coördination compounds)
9668 (effect of ultrasonic waves on chemicals)
9704 (polymerization of dimethylsiloxane)

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8933* Hardcoating of Pure and Alloyed Aluminum. **L'ossidazione anodica a spessore dell'alluminio e delle sue leghe.** (Italian.) F. Sacchi. *Alluminio*, v. 24, no. 1, Jan. 1955, p. 5-15.

Discussed in view of the mechanical exploitation of the resulting surface properties. Tables, photographs, micrographs. 9 ref.

8934 Research, the Key to Future Markets for Drying Oils. Odin Wilhelmy, Jr. and Harry W. Barr, Jr. *American Oil Chemists' Society, Journal*, v. 32, Apr. 1955, p. 204-207.

Preview of a government report on market potential of oils based on interviews with key industrial personnel. Predictions are based on activities between 1948 and 1952.

8935 Autoxidation and Oxidative Polymerization. W. O. Lundberg. *American Oil Chemists' Society, Journal*, v. 32, Apr. 1955, p. 207-208.

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Cites problems of drying time, films imperfection, color, and durability. 13 ref.

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8938 Polyvinyl Acetate and Copolymer Terminology. A. I. Goldberg. *American Paint Journal*, v. 39, May 9, 1955, p. 82, 84.

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8939* Influencing the Silicon Impregnation of Steel by Different Alloying Elements. **Die Beeinflussung der Insilizierung von Stahl durch verschiedene Legierungselemente.** (German.) Erich Fitzer. *Archiv für das Eisenhüttenwesen*, v. 26, no. 3, Mar. 1955, p. 159-169.

Protection of steel against scaling and corrosion by surface diffusion of different metals and by surface reactions with vapor mixtures of the subchlorides of Si, Al, and Ti protection of Cr steels against V_2O_5 corrosion. Micrographs, tables, graphs. 24 ref.

8940* Adherence of Iron-Saturated Zinc Melt to Manganese-Containing Iron. **Der Angriff eisengesättigter Zinkschmelzen auf manganhaltiges Eisen.** (German.) Hans-Joachim Wiester and Dietrich Horstmann. *Archiv für das Eisenhüttenwesen*, v. 26, no. 4, Apr. 1955, p. 199-204.

Influence of temperature and time on adherence of Zn to Fe containing up to 9.3% Mn. Tables, graphs, micrographs. 4 ref.

8941 Measuring Traffic Paint Abrasion With Beta Rays. B. W. Pocock. *ASTM Bulletin*, 1955, no. 206, May, p. 55-63.

The β-ray backscatter gate can determine dry film thicknesses to the nearest tenth of a mil. Photographs, graphs, table. 5 ref.

8942* Currentless Nickel Plating. **Stroomloos vernikkelen.** (Dutch.) A. Liket. *Bedrijf en Techniek*, v. 10, no. 225, Apr. 9, 1955, p. 162-164.

Principle; composition and control of Ni-plating bath; properties of Ni deposits. Diagrams, table. 24 ref.

8943 Metallizing With Copper Carbonyl. E. Crivelli. *Henry Brutcher Translation No.* 2902, 9 p. (From *La Chimica*, v. 17, no. 4, 1941, p. 185-186.) Henry Brutcher, Altadena, Calif.

Use of copper carbonyl for the coating of various organic objects with Cu.

8944 Vinyl Coatings' Biggest Drawback Licked. Kenneth Tator. *Chemical Engineering*, v. 62, May 1955, p. 228, 230.

Heavier films are obtained by hot spray or mastic techniques.

8945 Paint Formulation. II. Science in the Art. W. von Fischer and E. G. Bobalek. *Chemistry in Canada*, v. 7, Apr. 1955, p. 39-43.

Examples of developments having the greatest effect on the character of modern paint formulation. Table, micrographs. 12 ref.

8946 Coating Pipelines in Place Internally With Plastics. J. C. Watts. *Corrosion*, v. 11, May 1955, p. 210-216.

Describes cleaning processes, methods of application, materials used and results obtained. Graphs, photographs, diagram, tables.

8947 An Experimental Investigation of the Metal Spraying Process. A. Matting and K. Becker. *Electroplating and Metal Finishing*, v. 8, Apr. 1955, p. 143-145.

Mechanisms of the metal spraying process and results obtained in investigations of the processes taking place at the wire end. Diagrams, photographs.

8948 The Protective Function of Paint Coatings on Metals. P. J. Gay. *Electroplating and Metal Finishing*, v. 8, Apr. 1955, p. 153-156.

Some of the properties of surface treatments and of paint coatings are described, with reference to electrochemical corrosion processes. 7 ref.

8949 The Surface Areas of Evaporated Metal Films. B. M. W. Trapnell. *Faraday Society, Transactions*, v. 51, Mar. 1955, p. 368-370.

Measures area per unit wt. of Ni, Fe, Rh, Mo, Ta, and W evaporated films. Table, graph. 8 ref.

8950* Pentaerythritol in Synthetic Oils and Resins for Paints. **Über Pentaerythrit in Kunstölen und Kunstharzen für Anstrichmittel.** (German.) F. Schlenker. *Fette, Seifen, Anstrichmittel*, v. 57, no. 2, Feb. 1955, p. 87-89.

Possibilities of higher alcohols as a base for synthetic polyesters. Tables. 18 ref.

8951* Relations Between Film Thickness and Drying Time of Lacquers. **Über die Zusammenhänge zwischen Schichtstärke und Trockenzeit von Lackfarben.** (German.) W. Garm-

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sen. *Fette, Seifen, Anstrichmittel*, v. 57, no. 2, Feb. 1955, p. 91-95.

Measurements of the drying times of lacquers for surface dryness and for hardening through. Photograph, graphs, tables.

8952 Development, Evaluation of an Orange Enamel of Improved Light Fastness. William A. Gottfried. *Finish*, v. 12, May 1955, p. 50-51.

Investigation undertaken to develop light, stable, international orange colored coatings, for use on metals, and develop a suitable rapid method for measuring color change. Tables.

8953 Finishing Wood Turnings in a Tumbling Barrel. Evan C. Hinkley. *Industrial Finishing*, v. 31, Apr. 1955, p. 56 + 8 pages.

Includes photographs, diagrams.

8954 Mass Production Methods Spur Industrial Use of Refractory Ceramic Coatings. F. D. Shaw. *Iron Age*, v. 175, Apr. 21, 1955, p. 97-99.

Modern coatings allow substitution of lighter gage metals, sometimes permit mild steels to replace higher alloy grades. Photographs.

8955* Polyvinyl Acetate Emulsion-Base Paints. H. P. Beardsley. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Apr. 1955, p. 205-219.

Formulation and uses of emulsion-base paints are discussed. Tables, photographs.

8956* Recent Developments in Condensation Polymers for Paint Vehicles. Edward G. Bobalek. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 27, Apr. 1955, p. 220-230.

Points out the change from "lucky prospecting" to "penetration in depth" in coatings technology; alkyd, silicone, polyurethane, "Methylon" (R-108), and epoxy resins covered.

8957 Some Products of the Heat-Thickening of Linseed Oil. J. J. Sleightholme and A. J. Seavell. *Oil & Colour Chemists' Association, Journal*, v. 38, Apr. 1955, p. 178-190.

Studies effects of air and inert gases over heated oil. Suggests low temperature crystallization to study composition. Tables. 2 ref.

8958 Methods and Materials for Preventing the Skinning of Paint. H. J. Clarke and M. H. M. Arnold. *Oil & Colour Chemists' Association, Journal*, v. 38, Apr. 1955, p. 191-199.

Butyraldoxime and *tert*-butyl-dimethyl phenol are studied from 250 to 2500 p.p.m. Tables. 1 ref.

8959* Coatings From the Furans. Raymond B. Seymour. *Organic Finishing*, v. 16, Apr. 1955, p. 19-24.

History, chemistry, and applications. Table, photograph. 77 ref.

8960* Maintenance Painting Economics. James H. Cogshall. *Paint Industry Magazine*, v. 70, Apr. 1955, p. 10-12.

Two concepts are presented, one of initial cost and one of initial cost plus periodic inspection. Tables, photographs. 2 ref.

8961* Paint Thinners From Petroleum. IV. Aromatics and Alkyl Aromatics. George W. Waters. *Paint Industry Magazine*, v. 70, Apr. 1955, p. 14-17.

Odor and compatibility aspects. Tables, graphs.

8962 Butyl Titanate Heat and Corrosion Resistant Paints. A. B. Cox and G. Winter. *Paint Manufacture*, v. 25, Apr. 1955, p. 146-150.

New developments, formulations and applications on land, sea, and air. Table, photograph. 4 ref.

8963 The Study of Alkyd Resins. *Paint Manufacture*, v. 25, Apr. 1955, p. 151-152, 159.

A history of the theories of alkyd resins.

8964 Research and Development. A Review of Progress in the Industry. *Paint Manufacture*, v. 25, Apr. 1955, p. 153-159.

Reviews drying oils, natural resins, anti-corrosive and marine paints, and thermoplastic resins. 82 ref.

8965 The Technology of Paper Coating. II. *Paint, Oil & Chemical Review*, v. 118, Apr. 21, 1955, p. 16 + 6 pages.

Inorganic and organic coatings described. (To be continued.)

8966* Coatings and Coating Methods for Aluminum Foil. I. O. Robertson, Jr. *Paper, Film and Foil Converter*, v. 29, May 1955, p. 25-29.

Purposes, applications, and coating techniques are discussed. Photograph, diagrams.

8967* Coatings *Will* Protect Cooling Tower Headers. R. L. Elkins and G. O. Hult. *Pipe Line Industry*, v. 2, May 1955, p. 54-57.

Protective coatings, if applied properly and in sufficient film thicknesses, will control corrosion of piping headers to cooling towers. Photographs, table.

8968* Surface Treatment of Metals With Peroxygen Compounds. Paul H. Margulies. *Plating*, v. 42, May 1955, p. 561-566.

Equipment, baths, and procedures for various dip finishes for Cd, Ag, steel, Al and other metals. Photographs, micrographs.

8969* Diffusion Chromizing of Steel. **Dyfuzyjne chromowanie stali.** (Czech.) E. Gasior. *Prace Instytutów Ministerstwa Hutnictwa*, v. 7, no. 1, 1955, p. 1-10.

Development of steel protection by Cr diffusion. Treoretical aspects of the chromizing process and principal properties of protective coatings obtained. Graphs, tables. 32 ref.

8970* Inmet Oil as a Lubricant for Hot Tin-Plating of Iron Sheets. **"Inmet", zastępczy tłuszcz do ogniowego cynowania blachy.** (Czech.) J. Foryst, J. Madejski, and I. Zarzycki. *Prace Instytutów Ministerstwa Hutnictwa*, v. 7, no. 1, 1955, p. 11-16.

Laboratory and industrial tests on a substitute lubricant for hot tin-plating of Fe sheets. Tables, graphs, micrographs, diagram. 4 ref.

8971* Metal Coating of Glass, Porcelain, and Other Ceramic Products in High Vacuum. **Das Metallisieren von Glas, Porzellan u. dgl. im Hochvakuum.** (German.) H. Kalpers. *Sprechsaal*, v. 88, no. 6, Mar. 1955, p. 112-113.

Equipment and operation. Table, photographs.

8972 Aluminum Castings Get a Glassy Coat. *Steel*, v. 136, Apr. 25, 1955, p. 114, 116.

Enamel can be drilled or sawed without chipping; bare Al areas can be welded without disturbing the adjacent coating. Photographs.

8973 Bright-Dip Line for Aluminum or Brass. *Steel*, v. 136, May 2, 1955, p. 108-109.

Automatic line can adjust its sequence for brass or Al. Diagram, photographs.

8974* Porcelain Enamels for Aluminum. James I. Mueller. *Trend in Engineering, (University of Washington)*, v. 7, Apr. 1955, p. 21-24.

Satisfactory enamel may be obtained from either a highly fluoro- or boro-silicate glass, or from a phosphate glass; results indicate development possibilities of good lead-free coatings. Photographs, table. 16 ref.

8975 Automatic Hard Facing With Mild Steel Electrodes and Agglomerated Alloy Fluxes. J. S. McKeighan. *Welding Journal*, v. 34, Apr. 1955, p. 301-308.

Discussion of the mechanics of the process, the equipment required and its operation, the economies of the process, and a few general procedure suggestions. Photographs, diagram, table.

8976 Fused-in-Place Spray Metallized Coatings. Sam Tour. *Welding Journal*, v. 34, Apr. 1955, p. 329-336.

Methods of metallizing and fusing, metallurgical nature, and service applications are given for several spray metallized coatings. Photograph, diagram, micrographs, table.

8977 New Aluminizing Process for Steel Wire. Bernard S. Westerman. *Wire and Wire Products*, v. 30, Apr. 1955, p. 419-421, 483-485.

Process which is practicable from a production standpoint as well as economical in cost. Photographs, diagram.

Books and Miscellaneous Publications

8978 Protective Coatings for Metals. R. M. Burns and W. W. Bradley. American Chemical Society Monograph Series No. 129. 2nd Ed. 643 p. 1955. Reinhold Publishing Corp., New York. (TA462 B93p2)

Surface preparation; metallic and non-metallic coating types; application methods and use.

8979 Aluminum Paint and Powder. Junius David Edwards and Robert I. Wray. 3rd Ed. 219 p. 1955. Reinhold Publishing Corp., New York. (TS555 Ed96a3)

Manufacture; properties; testing; applications.

See also:
8851 (chemistry of pigments)
9116 (maintenance painting)
9427 (weld deposited coatings)
9497 (radiophosphorous coating retention during extrusion)
9705 (polyvinyl esters as coating materials)
9736 (plastic finishing)
9737 (corrosion protection of vinyl resins)

CORROSION

8980 Factors and Prevention of Corrosion. C. L. Hibert. *Aero Digest*, v. 70, Apr. 1955, p. 22-31.

A guide to the problem of judging, designing against, and preventing corrosion in aircraft. Diagrams, tables. 5 ref.

8981 Influence of Fine Particles on Corrosion of Economizer and Air-Preheater Surfaces by Flue Gases. Peter Hodson. *ASME, Transactions*, v. 77, Apr. 1955, p. 279-285; disc., p. 285-286.

A qualitative test of the formation temperature, extent, and nature of deposits from cleaned and dirty gas showed that deposits tend to build up in a narrow range and that cleaning the gas greatly decreases the rate of deposit build-up. Table, micrographs, diagram, photograph. 12 ref.

8982 Action of Boiler Water on Steel—Attack by Bonded Oxygen. C. E. Kaufman, W. H. Trautman, and W. R. Schnarrenberger. *ASME, Transactions*, v. 77, May 1955, p. 423-430; disc., p. 430-432.

Information relating to attack by boiler water on steel of boilers and superheaters. Table, diagrams, photographs, micrographs. 16 ref.

8983 Corrosion of Steel in Boilers—Attack by Dissolved Oxygen. H. A. Grabowski. *ASME, Transactions*, v. 77, May 1955, p. 433-441; disc., p. 441-448.

Reviews the various theories that have been proposed to explain the severe, although local, corrosion of furnace-wall tubes in high-pressure boilers. Metallurgical significance of failures and welding techniques also are discussed. Photographs, micrographs, graphs. 4 ref.

8984 An Interesting Case of Corrosion of Steam Turbines. A. Splittgerber. *Henry Brutcher Translation No.* 2925, 5 p. (From *Vom Wasser* (A Yearbook for Water Chemistry and Water Purification), v. 17, 1949, p. 146-149.) Henry Brutcher, Altadena, Calif.

Effect of steam and mixtures on corrosion of steel at 210 F. Corrosion phenomena of idle turbines is explained. Table, diagram.

8985 Titanium Reference Sheet. II. G. E. Hutchinson. *Chemical Engineering Progress*, v. 51, Apr. 1955, p. 38.

Data on corrosion.

8986 Advantages of Wood Lined Steel Pipe in Corrosive Services. E. H. Bronstein. *Corrosion*, v. 11, May 1955, p. 205-209.

Wood-lined steel pipe is extensively used to transport corrosive and abrasive substances at temperatures up to 185 F. Photographs, tables. 26 ref.

8987 High Temperature Corrosion Data. *Corrosion*, v. 11, May 1955, p. 241-245.

By means of tables, corrosion rates are indicated as low, moderate, or high versus specific temperatures. Tables.

8988 Results of Some Marine-Atmosphere Corrosion Tests on Magnesium-Lithium Alloys. P. D. Frost, F. W. Fink, H. A. Pray, and J. H. Jackson. *Electrochemical Society, Journal*, v. 102, May 1955, p. 215-218.

Ultralight, high-strength alloys for structural applications were exposed for 32 months to the sea-coast atmosphere near Daytona, Florida. One experimental alloy containing about 9% Li, had almost as good corrosion resistance as a commercial Mg-Al-Zn alloy. Micrographs, graphs, table. 8 ref.

8989 On the Nature of Lead Surfaces Passivated in Sulfuric Acid. E. J. Casey and K. N. Campney. *Electrochemical Society, Journal*, v. 102, May 1955, p. 219-225.

Experimental results are presented which show that the rate of ennoblement of the electrochemical potential of Pb, which is passivating in sulfuric acid, is markedly dependent on the concentration of hydrogen peroxide, whether formed by irradiation or added directly to the system. Graphs, micrographs, circuit diagram, tables, diagram. 14 ref.

8990 The Interactions of Static Stress and Corrosion With Aluminium Alloys. F. A. Champion. *Institute of Metals, Journal*, v. 83, Apr. 1955, p. 385-392.

Use of alloy compositions and heat-treatments designed to give the highest mechanical properties tends to result in varying degrees of susceptibility to stress-corrosion. Graphs, tables. 27 ref.

8991* Hydraulic Protection of Turbines From Cavitation Corrosion. **Gidravlicheskaia zashchita turbin ot kavitatsionnoi erozii.** (Russian.) G. S. Makeev and K. K. Shal'nev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 11, Nov., p. 87-104 + 2 plates.

Design and operating conditions of turbines under test. Types of cavitation causing damage, and suggested corrective measures. Diagrams, tables, photographs, graphs. 17 ref.

8992 Rate of Formation of Film on Metals and Alloys. G. P. Chatterjee. *Journal of Applied Physics*, v. 26, Apr. 1955, p. 363-365.

Film growth on Cu-Zn and Cu-Mg alloys with or without the addition of Al or Mn. Tables, graphs. 4 ref.

8993 Salt Spray Corrosion of Cadmium. Russell H. Wolff. *Metal Finishing*, v. 53, Apr. 1955, p. 48-55.

Gives curves relating wt. change to exposure time. Graphs, micrographs, tables. 4 ref.

8994 How Arkansas Fuel Oil Tackled Corrosion. W. M. Kyger and G. L. Shepherd. *Oil and Gas Journal*, v. 53, Apr. 18, 1955, p. 141-143.

Plant-wide program for control of CO_2 and H_2O attack in this sweet hydrocarbon treating unit. Tables.

8995 Current Requirement for Cathodic Protection of Well Casing. Leendert de Witte. *Oil and Gas Journal*, v. 54, May 9, 1955, p. 109-116.

Considers the interpretation of both open hole and inside casing spontaneous potentials surveys with regard to prediction and treatment of external casing corrosion. Graphs, tables, circuit diagrams. 5 ref.

8996* Smart Control of Humidity Licks Metal Corrosion During In-Process Storage. A. M. Beebee, Jr. *Power*, v. 99, May 1955, p. 110-111.

Design of in-process storage room. Photographs.

8997 Investigation of Accident Involving Titanium and Red Fuming Nitric Acid, December 29, 1953. P. M. Ambrose, J. C. Barrett, R. W. Huber, David Schlain, and V. C. Petersen. *U. S. Bureau of Mines, Information Circular* 7711, Mar. 1955, 34 p. (TN21 Un3i)

Stress corrosion testing of spot-welded Ti samples in red fuming nitric acid and investigation of explosion occurring during test. Tables, micrographs, photographs, diagram.

8998* Corrosion and Heat of Activation. **Korrosion und Aktivierungswärme.** (German.) Max Werner. *Werkstoffe und Korrosion*, v. 6, no. 3, Mar. 1955, p. 113-117.

Corrosion of Al and steel caused by different corrosive agents. Graphs, diagram. 4 ref.

Corrosion

8999* Oxidation and Corrosion at Medium and Low Temperatures. **Oxydations- und Korrosionsvorgänge bei mittleren und niedrigen Temperaturen.** (German.) Karl Hauffe. *Werkstoffe und Korrosion*, v. 6, no. 3, Mar. 1955, p. 117-129; disc., p. 129-130.

Because the oxidation and corrosion mechanisms are more complicated, owing to the presence of surface layer electrical fields, the mechanism of passivators on iron and nickel are considered, and a theory on corrosion resistance of chromium-nickel steels is presented. Diagrams, graphs. 39 ref.

9000* On Corrosion of Lead in Distilled Water. **Beitrag zur Kenntnis der Bleikorrosion in destilliertem Wasser.** (German.) Tihomil Markovic. *Werkstoffe und Korrosion*, v. 6, no. 3, Mar. 1955, p. 133-135.

Influence of the diffusion of O. Photograph, graphs. 14 ref.

9001* The Mechanism of the Decomposition of Hydrogen-Peroxide on Metallic Lead. **Der Mechanismus der Wasserstoffsuperoxyd-Zersetzung auf metallischem Blei.** (German.) Tihomil Markovic. *Werkstoffe und Korrosion*, v. 6, no. 3, Mar. 1955, p. 136-141.

The results obtained from the potentials of the galvanic cells Pb-Pt and Pb-Ag, plotted against time, determined the mechanism of catalytic decomposition. Graphs, tables. 9 ref.

9002* Relation of the Corrosion Rate of Iron to the pH of Solution, and the Passivation of the Metal in Alkaline Solutions. **Zavisimost' skorosti korrozii zheleza ot pH rastvora i passivatsiia metalla v shchelochnykh rastvorakh.** (Russian.) L. K. Lepin', A. Ia. Vaivade, and Z. F. Oshis. *Zhurnal Fizicheskoi, Khimii*, v. 29, no. 2, Feb. 1955, p. 350-355 + 1 plate.

Oxidation kinetics of Fe in various media; transition from γ to α form. Retardation of corrosion at certain pH values. Graphs, table, diffraction patterns. 10 ref.

See also:

9139 (corrosion by flue gases)

ELECTRICAL ENGINEERING

9003 Ferroelectricity. Robert C. Vernon. *American Journal of Physics*, v. 23, Apr. 1955, p. 183-191.

General description of the phenomena of ferroelectricity; comparison made with ferromagnetism. Diagrams, table, graphs.

9004* The Effects of Fungi on the Direct Current Surface Conductance of Electrical Insulating Materials. Leonard Teitell, Sigmund Berk, and Annette Kravitz. *Applied Microbiology*, v. 3, Mar. 1955, p. 75-81.

Effects of fungi on the electrical properties of the pressure-sensitive insulating tapes. Photograph, graphs, micrographs. 15 ref.

9005* The Effect of Insulating Layers on the Corona Current and the Disruptuve Voltage of Spark Gaps. **Der Einfluss isolierender Schichten auf den Koronastrom und die Durchschlagspannung von Funkenstrecken.** (German.) C. H. Hertz. *Arkiv för Fysik*, v. 9, no. 1, 1955, p. 1-28.

Experiments with a tip and plate electrode, with and without shellac; interpretation of differences in the corona current; utilization of findings for the determination of pores in lacquer layers and insulating foil. Diagrams, graphs, circuit diagrams. 25 ref.

9006* The Effect of Lacquer Layers on the Alternating-Current Corona on Tips and Wires. **Die Einwirkung von Lackschichten auf die Wechselstromkorona an Spitzen und Drähten.** (German.) C. H. Hertz. *Arkiv för Fysik*, v. 9, no. 1, 1955, p. 29-37.

Alternating-current coronas above a lacquer-covered metal plate and on free wires. Differences between lacquered and clean wire. Connections between phenomena investigated and observations on high-tension lines. Circuit diagrams, oscillograms. 14 ref.

9007* Development of Automobile and Tractor Alternating-Current Electrical Systems. **O razvitii avtotraktornogo elektrooborudovaniia peremennogo toka.** (Russian.) V. N. Akimov and M. L. Frezinskii. *Avtomobil'naia i traktornaia promyshlennost*, 1955, no. 1, Jan., p. 9-14.

Design and operational characteristics of a.c. generators and electrical systems. Diagram, circuit diagrams, graphs, table. 4 ref.

9008* Thermal Conduction in the Intermediate State of Superconductors. S. J. Laredo and A. P. Pippard. *Cambridge Philosophical Society, Proceedings*, v. 51, Apr. 1955, p. 368-376.

Simple theory of the effect is developed, based on the idea that phonon free paths are considerably shorter in the intermediate than in the superconducting state, owing to the high scattering caused by normal regions. Graphs, diagram. 11 ref.

9009 Variable-Reactance Dimming Control for Fluorescent Lamps. D. D. Kershaw. *Electrical Engineering*, v. 74, May 1955, p. 378-382.

Possible applications where the utilization of this type of dimming control will add to the flexibility of an installation. Graphs, diagram. 4 ref.

9010 Application of Germanium Power Rectifiers. R. M. Crenshaw. *Electrical Engineering*, v. 74, May 1955, p. 418-422.

Applications include its use in the chemical, Al, steel, Ti, and Sn reclaiming industries. Graphs, photographs.

9011 High-Potential Dielectric-Strength Testing. John Keefe. *Electrical Manufacturing*, v. 55, May 1955, p. 112-120.

Advantages and disadvantages of different types of tests. Describes instruments commercially available. Photographs, tables.

9012 Guided Missiles Make New Demands on Relays. *Electrical Manufacturing*, v. 55, May 1955, p. 129-139.

Testing, standardization, and applications of various types of electromagnetic relays. Graphs, tables, circuit diagrams, diagram, photographs. 1 ref.

9013* Generator Rotor-Angle Tests. W. H. Osterle and F. N. McClure. *Electric Light and Power*, v. 33, Apr. 15, 1955, p. 121-123.

Tests provide further verification of the methods used in static stability calculations. Diagrams, tables.

9014* Developments in the Field of Silicone Insulating Substances. **Entwicklungen auf dem Gebiete der Silicon-Isolierstoffe.** (German.) R. Lissmann and W. Ploch. *Elektro-Post*, v. 8, nos. 8-9, Mar. 29, 1955, p. 221-223.

Discusses versatility and properties of silicones used as insulators and in electrical equipment. Tables, graphs, photographs. 8 ref.

9015* Impulse Testing of Transformers. **Stossprüfung von Transformatoren.** (German.) Berthold Gänger. *Elektrotechnische Zeitschrift*, v. 76, Ausgabe A, no. 5, Mar. 1955, p. 177-186.

Testing problems and their solution. Diagrams, tables. 18 ref.

9016 Phenomenological Theory of Townsend Breakdown in Dielectrics. P. L. Auer. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 320-327.

Detailed analysis of the transient growth of the ionization current in a Townsend breakdown and derivation of the criterion for breakdown. Graph. 5 ref.

9017* Recent Contributions to Transformer Audible Noise Control. William B. Conover and Robert J. Ringlee. *Power Apparatus and Systems*, 1955, no. 17, Apr., p. 77-90; disc., p. 90.

Use of models to study transformer noise patterns and effects of external barriers. Graphs, diagrams, photographs, table. 18 ref.

9018* Turbine Generator Stator-Winding Temperatures at Various Hydrogen Pressures. J. R. M. Alger, C. E. Kilbourne, and D. S. Snell. *Power Apparatus and Systems*, 1955, no. 17, Apr., p. 232-250; disc., p. 250-251.

Temperatures and temperature rises in turbine generator windings, including both a theoretical approach to the problem of determining the temperature conditions and a comparison of test and calculated results on a particular machine. Graphs, diagrams. 6 ref.

9019* Impregnated Paper Capacitors. Joseph J. Drvostep. *Radio-Electronic Engineering*, v. 24, May 1955, p. 17-19, 31.

Construction, characteristics, and application of impregnated paper dielectric capacitors. Circuit diagram, diagrams, tables. 7 ref.

9020 Gaseous Electrical Insulation. J. D. Craggs and J. Marriott. *Research*, v. 8, Apr. 1955, p. 122-129.

Discusses a wide range of phenomena including mechanism of breakdown at high and moderate pressures. Graphs, tables, diagram. 24 ref.

9021 Advancements in the Panelescent Lamps. Richard M. Rulon. *Sylvania Technologist*, v. 8, Apr. 1955, p. 45-47.

Development of an electroluminescent lamp using a ceramic dielectric with steel or porcelain enamel as a structural material. Graphs, diagram. 5 ref.

9022* Discriminator Circuit Analysis. F. L. Morris. *Wireless Engineer*, v. 32, Apr. 1955, p. 93-98.

A circuit of unconventional design is examined and the conversion efficiency calculated. Circuit diagrams, graphs.

9023* Phase-to-Amplitude Modulation. Bryant D. Virmani. *Wireless World*, v. 61, Apr. 1955, p. 183-187.

Variable frequency transmitter based on polyphase oscillator. Diagrams, circuit diagram.

See also:

8627 (spark plug insulators)
9225 (electrical resistance measurement)
9775 (silicone rubber insulators)

ELECTROCHEMISTRY AND ELECTROPROCESSES

9024* Mercury Cell for Cathodic Separation of Elements. (English.) Djordje P. Lazarević. *Analytica Chimica Acta*, v. 12, no. 4, Apr. 1955, p. 363-367.

Method is based on the change of surface tension of Hg with that of the potential difference on the interface between Hg and the electrolyte. Tables, diagram. 6 ref.

9025 Influence of Anode Shape on Uniformity of Deposits in Nickel Plating. D. Mojert. *Henry Brutcher Translation No.* 2863, 5 p. (From *Metall*, v. 5, nos. 17-18, 1951, p. 388-392.) Henry Brutcher, Altadena, Calif.

With higher current densities resulting, the perforated-type anode provides greater uniformity of deposit thickness and reduces plating time.

9026 Effect of Ripple in Rectified Alternating Current Upon the Formation of Electrodeposits. M. E. Beckmann and F. Maass-Graefe. *Henry Brutcher Translation No.* 3025, 19 p. (From *Metalloberfläche*, v. 5, no. 11, 1951, p. A161-A169.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 2570, v. 1, Mar. 1952.

9027 Large-Sized Rolls Built up by Chromium Plating. M. E. Gol'dshtein. *Henry Brutcher Translation No.* 3480, 5 p. (Slightly condensed from *Stanki i Instrument*, v. 25, no. 5, 1954, p. 33-34.) Henry Brutcher, Altadena, Calif.

Technique for plating portions of rolls without a large rig or having to immerse the entire roll in a chromium plating bath, with resulting economies in equipment and electrolyte. Diagrams.

9028* Investigation of Local Temperature at Cathode During Electrolytic Deposition of Metallic Powders. **Issledovanie lokal'noi temperatury na katode pri elektroosazhdenii metallicheskikh poroshkov.** (Russian.) D. N. Gritsan and A. M. Bulgakova. *Doklady Akademii Nauk SSSR*, v. 100, no. 6, Feb. 21, 1955, p. 1111-1114.

Relation of max. value of temperature differences to the current densities of different $CdSO_4$ concentrations. Graphs, table. 5 ref.

9029 Electric Equipment for Aluminum Anodizing. D. C. Griffith. *Electrical Engineering*, v. 74, May 1955, p. 384-387.

Equipment and advantages are described together with background information on the processes themselves. Photographs, diagrams, graph. 11 ref.

9030 The Crystallization of Anodic Tantalum Oxide Films in the Presence of a Strong Electric Field. D. A. Vermilyea. *Electrochemical Society, Journal*, v. 102, May 1955, p. 207-214.

Nature of the crystals and the mechanism of their growth. Graphs, micrographs, tables. 3 ref.

9031 Stress During the Electrodeposition of Copper on Copper Substrate. Hussein Sadek, M. Halfawy, and S. G. Abdu. *Electrochemical Society, Journal*, v. 102, May 1955, p. 226-228.

Effect of current density, time, and coating composition and thickness on deflection of Cu strips. Graphs. 14 ref.

9032 Electrolytic Reduction of Titanium Monoxide. M. E. Sibert, Q. H. McKenna, M. A. Steinberg, and E. Wainer. *Electrochemical Society, Journal*, v. 102, May 1955, p. 252-262.

An electrolytic method for preparation of Ti metal from titanium monoxide is described. Photographs, tables, graphs, micrographs. 45 ref.

9033 Electroplating in Western Germany. I. Robert Pinner. *Electroplating and Metal Finishing*, v. 8, Apr. 1955, p. 131-135.

Organization, trade position, and structure of the plating industry. Map, photographs. 2 ref. (To be continued.)

9034 Automation in the Plating Industry. II. Productivity and Cost Control in Metal Finishing. H. Silman. *Electroplating and Metal Finishing*, v. 8, Apr. 1955, p. 136-139.

Discussion of 'through-type' plating machines with special reference to the Duplex Carriage, and 'Vertical Lift Return-Type' plants. Photographs, diagram. (To be continued.)

9035* The Use of Filters in Electroplating. J. B. Mohler and Charles E. Crowley. *Electrotypers and Stereotypers Magazine*, v. 41, Apr. 1955, p. 5 + 5 pages.

Sources of contamination; rough deposits; filtering methods and filtering rates. Diagrams, table.

9036 Potential at Zero Charge for Reversible and Ideal Polarized Electrodes. Paul Rüetschi and Paul Delahay. *Journal of Chemical Physics*, v. 23, Apr. 1955, p. 697-699.

Accounts for differences between experimental potentials at zero charge as obtained with reversible and ideal polarized electrodes. Graph, diagram. 30 ref.

9037 Carbon Materials Required in Electrolytic Reduction of Alumina. S. W. Martin and H. W. Nelson. *Journal of Metals*, v. 7, Apr. 1955, p. 540-543.

Conversion of alumina to metallic aluminum by electrolytic reduction. Flowsheets, diagrams, table, photographs. 10 ref.

9038* Possibilities for Improving the Ampere Efficiency in Aluminum Electrolysis. **Alumíniumelektrolízis amperhatásfok javításának lehetőségei.** (Hungarian.) Pál Nagy. *Kohászati Lapok*, v. 10, no. 3, Mar. 1955, p. 124-130.

Effects of increasing or stabilizing bath temperature, distance between the poles, composition of the bath, alumina concentration, and increase in current density. Graphs.

9039 Tin Fluoborate Plating. J. B. Mohler. *Metal Finishing*, v. 53, Apr. 1955, p. 59-61.

Addition agents; baths; operating procedures. Graphs, photograph. 10 ref.

9040* Porosity of Nickel Deposits By Autoradiographic Techniques. Russell H. Wolff, Mary Ann Henderson, and Stanley L. Eisler. *Plating*, v. 42, May 1955, p. 537-544.

Determination of porosity Ni by plating the Ni over an electrodeposit containing radioactive Fe. Photographs, table, autoradiographs. 11 ref.

9041* Zinc and Cadmium Plating. W. H. Millward. *Plating*, v. 42, May 1955, p. 545-549.

Baths, equipment, and procedures for automatic and still-vat Cd and still-vat Zn plating.

Electrochemistry and Electroprocesses

9042 Applying Direct Chromium Plate on Zinc. *Precision Metal Molding*, v. 13, May 1955, p. 53-54.

Operations necessary to produce a finished part ready for assembly. Photographs.

9043 Surface Treatment and Finishing of Light Metals. X. S. Wernick and R. Pinner. *Sheet Metal Industries*, v. 32, no. 336, Apr. 1955, p. 273-283.

Electrodeposition on Al; discusses tests for electroplated Al; immersion coatings. Review of the corrosion resistance of various coatings. Photographs, graphs, micrographs, diagrams, tables. 57 ref. (To be continued.)

9044* Cathode Film Studies by the Drainage Method. (English.) A. Brenner and G. Wranglén. *Svensk Kemisk Tidskrift*, v. 67, no. 2, 1955, p. 81-85.

In measuring the pH of the cathode film in Ni deposition by the "drainage method", the results obtained were found to be highly dependent on drainage time. Graphs. 4 ref.

9045* Nickel Plating. **Fornikling.** (Norwegian.) Frithjof Dyngvold. *Teknisk Ukeblad*, v. 102, no. 15, Apr. 14, 1955, p. 303-307.

Development and principles of electrolytic and chemical Ni plating; bath compositions; mechanical properties of the deposits. 7 ref.

9046 Tin Plating With Potassium Salts. Frederick A. Lowenheim. *Tin and Its Uses*, 1955, no. 31, p. 7-10.

Inventor expresses his views on advantages of the potassium stannate tin-plating bath process. Graphs, table. 9 ref.

9047 Introductory Plating Studies on Protecting Molybdenum From High-Temperature Oxidation. L. E. Vaaler, C. A. Snavely, and C. L. Faust. *U. S. Atomic Energy Commission, BMI-813*, 1953, 20 p. (UF767 U3b)

Electrodeposited Ni protected Mo from air oxidation for 100 hr. at 1800 F. Nickel was deposited on Mo after various pretreatments: a.c. electrolysis in hydrofluoric acid; a dip in alkaline ferricyanide solution; or a combination of anodic cleaning in alkali, a dip in nitric acid and in alkaline ferricyanide. In most cases, a thin layer of Cr or Fe was deposited prior to Ni deposition. All deposits blistered when heated to 800 F in a vacuum (100 μ) except when Fe was deposited prior to the Ni. Attempts were unsuccessful to deposit Cu which would not blister on Mo when heated. Micrographs, tables. 7 ref.

9048* Electrode Potentials of Metals in Fused Salts. **Elektrodnye potentsialy metallov v rasplavlennykh soliakh.** (Russian.) Iu. K. Delimarskii. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 1, Jan. 1955, p. 28-38.

Decomposition potentials at 700 C; electrochemical charges; anion effects. Tables. 40 ref.

9049* Investigation of Cathode Processes in Chromium Electroplating. **Issledovanie katodnykh protsessov pri gal'vanicheskom khromirovanii.** (Russian.) A. I. Levin and A. I. Falicheva. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 1, Jan. 1955, p. 95-104.

Influence of chromium trioxide concentration on polarization of Pt-Cr cathodes. Graphs. 17 ref.

9050 Problem of the Variation in Acidity of the Cathode Field During Electrolysis. **K voprosu ob izmenenii kislotnosti katodnogo prostranstva pri elektrolize.** (Russian.) S. I. Berezina, A. Sh. Valeev, G. S. Vozdvizhenskii, T. N. Grechukhina, and G. P. Dezider'ev. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 2, Feb. 1955, p. 237-243.

Effect of temperature, mixing, additions of neutral salts, and other factors. Tables, graphs, diagram. 6 ref.

9051* Eelectrochemical Investigation of Some Binary Systems in Nitromethane. **Elektrokhimicheskoe issledovanie nekotorykh dvoinykh sistem v nitrometane.** (Russian.) V. S. Galinker and A. Fiks. *Zhurnal Obshchei Khimii*, v. 25, no. 3, Mar. 1955, p. 463-468.

Includes tables, graph. 6 ref.

9052* Cathode Polarization During Galvanic Tinplating From Chloride Electrolytes. **Katodnaia poliarizatsiia pri gal'vanicheskom luzhenii iz solianokislykh elektrolitov.** (Russian.) I. E. Gurevich. *Zhurnal Prikladnoi Khimii*, v. 28, no. 3, Mar. 1955, p. 285-290.

Effects resulting from gelatin, α-naphthol, cresol, or other additions on cathode polarization in relation to current density. Graphs, tables. 7 ref.

Books and Miscellaneous Publications

9053 The Industrial Electrolysis of Non-Metals. **Die technische Elektrolyse der Nichtmetalle.** (German.) Jean Billiter. 401 p. 1954. Springer-Verlag, Vienna. (TP255 B49tn)

Principles and methods for the preparation of O, H, and "heavy water"; electrolytic oxidation and reduction processes; production of Cl, alkalies, and Cl-O compounds; production costs.

See also:

8725 (rotating Pt electrode)
8742 (plating bath analysis)
9245 (electrolytic deposition of metal powders)
9460 (properties of Cu plate)
9762 (electroplating waste disposal)

ELECTRONICS

9054* Iron Oxide-Base Semiconductors of Spinel Structure. (English.) M. Déri and J. Millner. *Acta Chimica Academiae Scientiarum Hungaricae*, v. 5, nos. 3-4, 1955, p. 215-233.

Preparation and properties of composition of the system Fe_2O_3-ZnO-TiO_2. Tables, graphs. 18 ref.

9055* Certain Semiconductor Properties of Cu_2O. **Über einige Halbleitereigenschaften des Kupferoxyduls.** (German.) C. Fritzsche. *Annalen der Physik*, v. 15, nos. 3-4, 1955, p. 178-181.

Includes diagrams. 14 ref.

9056* Experimental Proof of Schottky's Noise Equations as Applied to the New Semiconductor High Vacuum Diode in the White Noise Region. **Experimentelle Bestätigung der Schottkyschen Rauschformeln an neueren Halbleiter-Flächendioden im Bereich des weissen Rauschspektrums.** (German.) Walter Guggenbühl and Max J. O. Strutt. *Archiv der elektrischen Übertragung*, v. 9, no. 3, Mar. 1955, p. 104-108.

Formula for the available noise power of *p-n*-junction diodes are derived on the assumption of two uncorrelated noise currents connected with the forward and backward junction current. Graphs, circuit diagrams. 6 ref.

9057* Correlative Conditions in Schottky Effect. **Korrelationsverhältnisse beim Schroteffekt.** (German.) Herbert W. König. *Archiv der elektrischen Übertragung*, v. 9, no. 3, Mar. 1955, p. 109-116.

Analysis of noise and space charge relationships. Diagram, graphs. 34 ref.

9058* Theory of Noise Quadripoles. **Theorie rauschender Vierpole.** (German.) Horst Rothe and Walter Dahlke. *Archiv der elektrischen Übertragung*, v. 9, no. 3, Mar. 1955, p. 117-121.

Studies of quadripoles with internal sources of noise. Diagrams, graph. 3 ref.

9059 Simple Design for Station-Built Console. C. M. Edmonds. *Audio*, v. 39, Apr. 1955, p. 21-25.

Designing and constructing a console for the specific requirements of an FM station. Photographs, circuit diagrams.

9060 Amplifiers. Edgar M. Villchur. *Audio*, v. 39, Apr. 1955, p. 34 + 5 pages.

An analysis of the fundamental nature of amplification, and a description of the working principles of pneumatic, mechanical, carbon, vacuum-tube, transistor, magnetic, and dielectric amplifiers. Diagrams, photographs. 9 ref.

9061 The Field-Effect Transistor. Ian Murno Ross. *Bell Laboratories Record*, v. 33, May 1955, p. 167-172.

It is capable of performing many of the same functions as

junction and point contact types, such as amplification or oscillation, and it has the advantages of small size and low power consumption. Photographs, diagrams, graphs.

9062 Reflex Klystrons for Microwave Radio Relay Systems. E. D. Reed. *Bell Laboratories Record*, v. 33, May 1955, p. 173-177.

Includes photographs, diagrams, graphs.

9063 On the Behavior of Rapidly Diffusing Acceptors in Germanium. F. van der Maesen and J. A. Brenkman. *Electrochemical Society, Journal*, v. 102, May 1955, p. 229-234.

Studies of the acceptor activity of Cu and Ni and their diffusion in Ge. Tables, graphs. 12 ref.

9064* Designing Reliable Transistor Circuits. II. Norman B. Saunders. *Electronic Design*, v. 3, Apr. 1955, p. 36-39.

Describes a variety of specific stabilization methods. Diagrams, circuit diagrams, graphs. 14 ref.

9065 Microwave Modulator Uses Ferrite Gyrator. J. N. Barry and W. W. H. Clarke. *Electronics*, v. 28, May 1955, p. 139-141.

Coaxially mounted ferrite slug in a circular wave guide section modulates microwave energy without disturbing power source. Photographs, diagram, graphs, circuit diagrams. 7 ref.

9066 Fan-Pencil Antenna for Search Radar. Vernon E. Trinter. *Electronics*, v. 28, May 1955, p. 142-143.

Primary radar feed, used in conjunction with single reflector, gives choice of fan beam for searching or pencil beam for closer examination of target with throw of switch. Photographs, graphs.

9067 Band-Pass Filters Using Strip-Line Techniques. E. H. Bradley and D. R. J. White. *Electronics*, v. 28, May 1955, p. 152-155.

Use of etched wiring and sandwich construction simplifies fabrication. Diagrams, table, photographs, graphs.

9068 Cathode-Ray Display of Seismic Recordings. G. M. Groenendyke and G. B. Loper. *Electronics*, v. 28, May 1955, p. 160-165.

Equipment developed to serve as a rapid means of monitoring the played-back seismic records either before or after analytical treatment without requiring the making of a conventional seismogram. Photographs, diagrams, circuit diagrams.

9069 Feedback-Stabilized Transistor Amplifier. Dean W. Slaughter. *Electronics*, v. 28, May 1955, p. 174-175.

Amplifier can be built with Si junction transistors for stable operation despite high ambient temperatures. Diagrams, photograph, table. 2 ref.

9070* Peak Current of Oxide Cathodes During Arc Discharges. **Der Spitzenstrom von Oxydkathoden in Bogenentladungen.** (German.) Jürgen Vogt. *Elektrotechnische Zeitschrift*, v. 76, Ausgabe A, no. 5, Mar. 1955, p. 192-195.

Investigations in gas-containing tubes. Diagrams. 20 ref.

9071* A New High Frequency Meter for Radio Transmitters. **Neue Hochfrequenz-Messgeräte für die Funkübertragungs-Technik.** (German.) H. G. Thilo and K. Thalmayer. *Frequenz*, v. 9, no. 3, Mar. 1955, p. 69-80.

Description and method of operation. Diagrams, photographs. 4 ref.

9072* Noise Coefficient of Linear Transducers and Amplification Tubes. **Die Rauschzahl linearer Vierpole und Verstärker-Röhren.** (German.) H. W. König. *Frequenz*, v. 9, no. 4, Apr. 1955, p. 101-109.

Method of determination; neutralization circuits. Diagrams. 16 ref.

9073 Aircraft Antennas. J. V. N. Granger and J. T. Bolljahn. *I.R.E., Proceedings*, v. 43, May 1955, p. 533-550.

Summarizes the state of the art as regards the development of communication and navigation antennas for conventional aircraft. Diagrams, graphs. 22 ref.

9074 Some Aspects of the Design of Power Transistors. N. H. Fletcher. *I.R.E., Proceedings*, v. 43, May 1955, p. 551-559.

Reduction of emitter bias caused by transverse current flow in the base region. Thermal stability and mechanical design. Graphs, diagram, photographs. 4 ref.

9075 Recovery Time Measurements on Point-Contact Germanium Diodes. T. E. Firle, M. E. McMahon, and J. F. Roach. *I.R.E., Proceedings*, v. 43, May 1955, p. 603-607.

Includes circuit diagrams, graphs. 4 ref.

9076* Progress in Scientific Technical Research. **Framsteg inom forskning och teknik. IV.** Computers and Automation. **Matematikmaskiner och automation.** (Swedish.) E. Velander. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning*, v. 26, no. 2, 1955, p. 36-45.

Computers in industry; data processing; automation. Photographs, diagram. 18 ref.

9077 Injected Current Carrier Transport in a Semi-Infinite Semiconductor and the Determination of Lifetimes and Surface Recombination Velocities. W. van Roosbroeck. *Journal of Applied Physics*, v. 26, Apr. 1955, p. 380-391.

Includes graphs. 32 ref.

9078 An Electronic Phase-Shift Tube for Microwave Frequencies. D. H. Pringle. *Journal of Scientific Instruments*, v. 32, Apr. 1955, p. 125-127.

Performance of the tube is discussed in detail. Diagram, graph, tables. 4 ref.

9079* Determination of the Cathode Sensitivity Distribution by Photomultiplier. **A katódérzékenységeloszlás meghatározása fotomultipliernél.** (Hungarian.) Zsolt Náray. *Magyar Fizikai Folyóirat*, v. 3, no. 1, 1955, p. 1-12.

Clarification of the difficulties arising during the reproduction of photocell measurements. Change of sensitivity as a function of place and direction of light incidence. Diagrams, graphs. 1 ref.

9080* Electronic Control of Machine Tools. *Mechanical World and Engineering Record*, v. 135, Apr. 1955, p. 158-161.

Several forms of tracer control equipment which are applicable to a wide range of machine tools. Diagrams, photographs.

9081* Influence of the Grid-Plate Transconductance Characteristics on the Frequency Constant of Oscillators. **Über den Einfluss der Gitterkennlinien-Steilheit auf die Frequenzkonstantz von Oszillatoren.** (German.) E. Rehbock. *Nachrichtentechnik*, v. 5, no. 1, Jan. 1955, p. 21-24.

Includes diagrams. 3 ref.

9082* Diagram Recorder, a Universal Tube-Testing Device. **Der Kennlinienschreiber, ein universelles Röhrenprüfgerät.** (German.) Christine Berthold and H. Berthold. *Nachrichtentechnik*, v. 5, no. 3, Mar. 1955, p. 116-120.

Includes drawings, photographs, diagrams. 1 ref. (To be continued.)

9083* Electric Breakdown and Light Emission in CdS Single Crystals. (English.) G. Diemer. *Philips Research Reports*, v. 9, Apr. 1954, p. 109-121.

Includes diagrams, graphs. 9 ref.

9084* The Velocity Distribution of Electrons of Thermionic Emitters Under Pulsed Operation. II. Experimental Results and a Tentative Theoretical Explanation. (English.) C. G. J. Jansen, R. Loosjes, and K. Compaan. *Philips Research Reports*, v. 9, Aug. 1954, p. 241-258.

Includes diagrams. 23 ref.

9085 A Photo-Multiplier Tube for Scintillation Counting. R. Champeix, H. Dormont, and E. Morilleau. *Philips Technical Review*, v. 16, Mar. 1955, p. 250-257.

Considerations governing the design of the tube; discussion of the features of the scintillating material; a summary of the advantages of the tube from the point of view of noise-level. Table, diagrams, graphs, photograph.

Electronics

9086* Properties of Ohmic Contacts to Cadmium Sulfide Single Crystals. R. W. Smith. *Physical Review*, v. 97, ser. 2, Mar. 15, 1955, p. 1525-1530.

Usual materials and techniques for making electrical contact to CdS single crystals are not satisfactory. It has been found that In and Ga make ohmic contact to the crystals. Oscilloscopes, graphs, diagram. 15 ref.

9087* Space-Charge-Limited Currents in Single Crystals of Cadmium Sulfide. R. W. Smith and A. Rose. *Physical Review*, v. 97, ser. 2, Mar. 15, 1955, p. 1531-1537.

Use of pulsed voltages made possible the observation of currents close to those of a trap-free solid. Graphs, diagrams, table. 9 ref.

9088* Electrical Properties of Gallium Antimonide. D. P. Detwiler. *Physical Review*, v. 97, ser. 2, Mar. 15, 1955, p. 1575-1578.

Data are presented on the conductivity and Hall coefficient of several samples. Graphs. 7 ref.

9089* Mobility of Electrons and Holes in the Polar Crystals, PbS. Richard L. Petritz and Wayne W. Scanlon. *Physical Review*, v. 97, ser. 2, Mar. 15, 1955, p. 1620-1626.

Measurements of Hall effect and resistivity on single crystals over the temperature range 77 to 600 K. Graphs. 21 ref.

9090 High-Frequency Gas Discharge Plasma in Hydrogen. David J. Rose and Sanborn C. Brown. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 310-316.

Theory of calculating breakdown mechanism is generalized by taking into account the effect of space charge, which permits calculation of the microwave field strength required to maintain certain simple plasmas in the steady state. Graphs, diagram.

9091 Temperature Dependence of the Width of the Band Gap in Several Photoconductors. Richard H. Bube. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 431-433.

Data on the variation of the width of the forbidden gap between 90 and 400 K, for CdS, CdSe, CdTe, and ZnSe. Graphs, table. 11 ref.

9092 Properties of Germanium Doped With Nickel. W. W. Tyler, R. Newman, and H. H. Woodbury. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 461-465.

Measurements of electrical and optical properties of Ge crystals, with Ni as major impurity, are similar to Fe- and Co-doped crystals. Graphs, table. 6 ref.

9093* Adsorption and Surface Potential of Semi-Conductors. I. Photo-Enhanced Adsorption of Oxygen and Change of Contact Potential of ZnS Phosphors With Illumination. (English.) Akio Kobayashi and Shinji Kawaji. *Physical Society of Japan, Journal*, v. 10, no. 4, Apr. 1955, p. 270-273.

Correlation between the change of the surface potential of ZnS due to irradiation and the photo-enhanced adsorption of O preliminarily. Diagrams, graphs. 5 ref.

9094* Plastics as Capacitor Dielectrics. I. Cellulose Acetate. George Mistic. *Plastics Technology*, v. 1, Apr. 1955, p. 154-157, 164.

Discusses dielectric characteristics of this earlier synthetic dielectric. Table, graphs, photographs. 5 ref. (To be continued.)

9095* Microwave Testing With Millimicrosecond Pulses. A. C. Beck. *Radio-Electronic Engineering*, v. 24, May 1955, p. 13-15, 23.

Method of detecting very small imperfections in wave guides. Photographs, circuit diagram, diagrams.

9096 New Light Amplifiers. Sol Heller. *Radio-Electronics*, v. 26, May 1955, p. 45-47.

Equipment developed for reproducing and controlling light. Diagrams, photographs.

9097 Transistor Auto Light Control. Edwin Bohr. *Radio-Electronics*, v. 26, May 1955, p. 58-60.

Automatically operates lights, turning them off and on, as required by light and driving conditions. Photographs, circuit diagram, graph.

9098* Theory of Thermal Noises. Teoriia teplovykh shumov. I. (Russian.) S. M. Rytov. *Radiotekhnika*, v. 10, no. 2, Feb. 1955, p. 3-13.

General electrodynamic theory of thermal electrical fluctuations; wave guide form of Kirchhof's law. Graph, diagram. 5 ref.

9099 Germanium Diode Oscillator. Irving Gottlieb. *Radio & Television News*, v. 53, May 1955, p. 55, 106-107.

Circuit in which a diode can be used as oscillator for test or code practice applications. Graph, photograph, circuit diagram.

9100 Storage Devices for High Speed Calculators. A. D. Booth. *Research*, v. 8, Apr. 1955, p. 130-140.

Describes some of the systems which have been or could be used as data stores. Diagrams, graphs, photograph. 57 ref.

9101* Modular Design of Electronic Equipment. Leigh M. Matthews. *Sperry Engineering Review*, v. 8, Mar.-Apr. 1955, p. 8-12.

Solution to the problems of cost, space requirements, and time encountered in the mass production of electronic circuitry. Diagrams, photographs. 7 ref.

9102* New Computing Facility. Bernard H. Stowens. *Sperry Engineering Review*, v. 8, Mar.-Apr. 1955, p. 19-21.

Basic operations, applications, and operating techniques of an electronic analogue computer. Circuit diagrams, photograph.

9103 An Optical Comparator for Measuring Cathode-Grid Spacing. Alfred D. Johnson. *Sylvania Technologist*, v. 8, Apr. 1955, p. 52-54.

Includes diagrams.

9104 Electron-Tube Life and Reliability. V. Marcus A. Acheson. *Sylvania Technologist*, v. 8, Apr. 1955, p. 56-61.

Considers modifications of existing plans of life testing, with respect to minimizing inspection costs. 4 ref.

9105 Evaluation of Junction Diodes. Frank Finnegan. *Tele-Tech & Electronic Industries*, v. 14, May 1955, p. 76 + 6 pages.

Silicon and Ge junction diodes, including small-area, diffused and grown junction types, defines characteristics making one best suited for a particular application. Graphs.

9106* Long-Life Electronic Tubes. Tubes à longue durée. (French and German.) W. Dahlke. *Vide*, v. 10, no. 55, Jan. 1955, p. 318-335.

Evaluation of the longevity of tubes; causes and prevention of failure. Tables, diagrams. 19 ref.

9107* Long-Life Oxide-Coated Cathode. (French and English.) S. Takada and S. Fujino. *Vide*, v. 10, no. 55, Jan. 1955, p. 336-339.

Investigates the oxide evaporation as a life-shortening cause. Graphs, diagram. 5 ref.

9108* Oxide Cathode in Long-Life Electronic Tubes. La cathode à oxydes dans les tubes de très grande durée. (French.) G. Saintesprit and P. Meunier. *Vide*, v. 10, no. 55, Jan. 1955, p. 340-346.

The use of electrolytic Ni and high W-Ni alloy, as a base metal, is emphasized. Tables, graphs.

9109* On the Semiconducting Properties in Thoria Cathode. (French and English.) S. Takahashi. *Vide*, v. 10, no. 55, Jan. 1955, p. 352-354.

Effect of O on the electric conductivity; thermionic emission and measurement of the thermoelectric power of thoria cathodes. Graphs. diagram. 3 ref.

9110* Emission Slumping of Oxide-Coated Cathodes. (French and English.) K. Amakasu, T. Imai, and M. Asano. *Vide*, v. 10, no. 55, Jan. 1955, p. 366-379.

Emission decay is attributed to anode contaminations; slumping is corrected in terms of processing methods of anode nickel material and activation schedules of oxide-coated cathodes. Graphs, table. 8 ref.

9111* **D. C. Stability of Transistor Circuits.** Francis Oakes. *Wireless World*, v. 61, Apr. 1955, p. 164-167.

Basic formula and design data for function types. Graphs, table, diagrams, photograph.

9112* **Wide Range Electrostatic Loudspeakers. I. Principles of Design for Operation at Low as Well as High Frequencies With Negligible Distortion.** P. J. Walker. *Wireless World*, v. 61, May 1955, p. 208-211.

The electrostatic loudspeaker may well supersede the moving coil for high-quality sound reproduction. Diagrams, graphs, photographs. (To be continued.)

9113* Current Noise in Semiconductors. **Zum Stromrauschen von Halbleitern.** (German.) Willy Baumgartner and Hans Ulrich Thoma. *Zeitschrift für angewandte Mathematik und Physik*, v. 6, no. 1, Jan. 1955, p. 66-68.

Discusses the possibility of a correlation between L. F. noise and photo-conductive properties.

9114* Electrical Properties of Chalcopyrite. Effect of Surface Treatment on the Rectifying Properties of Crystals. **Elektricheskie svoistva khal'kopirita. Vliianie poverkhnostnoi obrabotki na vypriamliaiushchie svoistva kristallov.** (Russian.) B. I. Boltaks and N. N. Tarnovskii. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 3, Mar. 1955, p. 402-409.

Synthesis of $CuFeS_2$; temperature and electroconductivity, and coefficient of thermal-e.m.f.; rectification in $CuFeS_2$-W contact. Graphs, tables. 7 ref.

Books and Miscellaneous Publications

9115 Transistors. **Transistoren.** (German.) M. J. O. Strutt. Monographs of Electrical Communications, v. 18. 166 p. 1954. S. Hirzel Verlag, Zürich. (QC544.T3 St89t)

Theory of materials for transistors. Application of point transistors, in high and low frequency stages.

See also:

8582 (electronic flight simulators)
8666 (semiconductor theory)
9256 (analog computers)
9641 (photoelectric reader in business machines)

ENGINEERING ECONOMICS

9116 Maintenance Painting in the Process Industries. Kenneth Tator. *American Paint Journal*, v. 39, Apr. 18, 1955, p. 40 + 7 pages.

Practical and economic aspects of this often neglected factor. 2 ref.

9117 How Plant Size Affects Unit Costs. S. C. Schuman. *Chemical Engineering*, v. 62, May 1955, p. 173-176.

A quantitative analysis of the above for a hypothetical product. Table, graphs. 10 ref.

9118 Germany Shifts to New Technology. Karl Falk. *Chemical Engineering*, v. 62, May 1955, p. 182-186.

Newly developed chemical industry is lessening its dependence on coal byproducts. Photographs.

9119 Comparison of Chemical and Petroleum Accounting in Analysis of New Plant Economics. R. A. Wiegand. *Chemical Engineering Progress*, v. 51, Apr. 1955, p. 199-204.

A step-by-step study. Tables. 3 ref.

9120 At Nation's Crossroads, Chemicals in Spurt. *Chemical Week*, v. 76, Apr. 23, 1955, p. 20-22, 24.

Depicts chemical production in Chicago area. Table, map, photograph.

9121* Selenium, an Important Basic Material for Industrial Production. **Selen, ein wichtiger Grundstoff der Technik.** (German.) Wilhelm von Haken. *Chemische Industrie*, v. 7, no. 3, Mar. 1955, p. 93-96.

Scarcity and increased costs are hindering technical progress. 2 ref.

9122* **Where Will New England Get Its Future Gas Supplies?** Hall M. Henry. *Gas*, v. 31, Apr. 1955, p. 71-74, 76.

Considers costs for gas from coal and shale oil. Tables.

9123 The Case History Method as a Tool. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 803-805.

Two hypothetical case studies of chemical development are presented to four panels for consideration. Opinions are tabulated.

9124 The Natural-Gasoline Producer's Stake in Chemical Manufacture. L. O. Crockett. *Oil and Gas Journal*, v. 53, Apr. 18, 1955, p. 162 + 10 pages.

Expanding market possibilities in the L.P.G. and petrochemical field. Graphs, charts. 19 ref.

9125 L.P.G. Production Up 27 Per Cent in 1955. John M. McGivern. *Oil and Gas Journal*, v. 53, Apr. 18, 1955, p. 184-191.

Tabular data by states.

9126* **Canadian Oil Developments in 1954.** J. L. Irwin. *Petroleum Times*, v. 59, Apr. 15, 1955, p. 356-359.

Includes photographs, graphs, tables, map.

9127* The European Steel Market in 1954. **Der europäische Stahlmarkt 1954.** (German.) H. W. A. Waring. *Stahl und Eisen*, v. 75, no. 8, Apr. 21, 1955, p. 445-452.

Raw materials; production statistics; competition of other materials; technical developments; outlook for 1955.

See also:

8842 (economics of wool wax)
8934 (market potentials of drying oils)
8960 (maintenance painting costs)

FLUID MECHANICS

9128 The Fall of Single Liquid Drops Through Water. Shengen Hu and R. C. Kintner. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 42-48.

Behavior study of drops falling under steady-state conditions in a stationary water field as governed by the pertinent physical properties of the system. Tables, graphs. 32 ref.

9129 Transport of Momentum and Energy in a Ducted Jet. I. Experimental Study of a Nonisothermal Jet of Air Discharging Into a Duct. II. Theoretical Study of Turbulent Transport of Momentum, Energy, and Matter in Ducted Coaxial Streams. III. Correlation of Profiles of Total Momentum and Energy Flux in a Nonisothermal Jet Discharging Into a Duct. L. G. Alexander, Arnold Kivnick, E. W. Comings, and E. D. Henze. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 55-73.

Includes tables, graphs, diagram, photograph. 28 ref.

9130 Upward Cocurrent Annular Flow of Air and Water in Smooth Tubes. Seymour Calvert and Brymer Williams. *A.I.Ch.E. Journal*, v. 1, Mar. 1955, p. 78-86.

Method developed to predict liquid holdup and pressure drop in flowing systems. Graphs, diagrams. 22 ref.

9131* **The Behaviour of Fluids of Quasi-Spherical Molecules. IV. Concerning Trouton's and Hildebrand's Rules.** S. D. Hamann. *Australian Journal of Chemistry*, v. 8, Feb. 1955, p. 21-25.

Greater generality of Hildebrand's rule is explained. Graphs. 8 ref.

9132* Investigation of Tridimensional Flow Through Axial Cascade With Cylindrical Blades. **Untersuchugen über die dreidimensionale Strömung durch axiale Schaufelgitter mit zylindrischen Schaufeln.** (German.) H. Schäffer. *Forschung auf dem Gebiete des Ingenieurwesens*, v. 21, Ausgage B, no. 1, 1955, p. 9-19.

Influence of blade design on distribution of pressure and stress. Tables, diagrams, photographs. (To be continued.)

Fluid Mechanics

9133* Hydraulics for Pipeliners. IX. Bernoulli's Equation for Steady State Flow. C. B. Lester. *Pipe Line News*, v. 27, Apr. 1955, p. 35-41.

Includes graphs, diagrams.

9134 An Experimental Study of the Interaction of a Plane Shock Wave With a Contact Region. R. M. McKee. *University of Toronto, Institute of Aerophysics, UTIA Technical Note No.* 1, Sept. 1954, 47 p. (TL570 T64.84t)

Photographic approach, using schlieren and interference techniques, which yielded direct qualitative information about the structure of the flow. Photographs, graphs, tables, diagrams. 10 ref.

FOOD TECHNOLOGY

FUELS AND COMBUSTION

9135* Gasification of Fuel Oil. **Gasificación de combustibles líquidos pesados (fuel-oil).** (Spanish.) Henri Guillon. *Acero y energía*, v. 12, no. 67, Jan.-Feb. 1955, p. 29-36.

Theoretical principles of above process, industrial experience, and fields of application. Diagram, graphs, photographs.

9136 An Analysis of the Stability of Carbon Monoxide-Hydrocarbon-Air Flames. Arthur Levy and Philip F. Kurz. *American Chemical Society, Journal*, v. 77, Mar. 20, 1955, p. 1459-1461.

Suggests preflame preferential oxidation of the hydrocarbon as cause for anomaly. Tables, graph. 13 ref.

9137 A Study of Spreader-Stoker Reinjection Systems. W. C. Holton. *American Society of Mechanical Engineers, Paper No.* 54—A-117, 1955, 14 p. (TJ1 Am35p)

Two types of material balances on reinjection systems are described and illustrated to show that as much as 61% of the noncombustible material in the reinjected fly ash may remain on the grate. Tables, graphs. 10 ref.

9138 Supression of Burner Oscillations by Acoustical Dampers. Abbott A. Putnam and William R. Dennis. *American Society of Mechanical Engineers, Paper No.* 54—A-174, 1955, 10 p. (TJ1 Am35p)

The effectiveness of a quarter-wave tube was found to be critically dependent on length, but relatively insensitive to location, as long as the tube is placed in the region of the pressure antinode. Similarly, the effectiveness of a Helmholtz resonation depended critically on volume, for a particular neck, but is quite insensitive to location. Graphs, diagrams.

9139 The Use of Additives for the Prevention of Low-Temperature Corrosion in Oil-Fired Steam-Generating Units. E. C. Huge and E. C. Piotter. *ASME, Transactions*, v. 77, Apr. 1955, p. 267-274; disc., p. 274-278.

Test data and the results of actual operating experience which show the effect of additives on the corrosive nature of flue gases. Photographs, tables, graphs, diagrams. 10 ref.

9140* Contribution to the Study of Sampling, Reduction, and Analysis of Solid Mineral Fuels. **Contribution à l'étude sur l'échantillonnage, la réduction et l'analyse des combustibles minéraux solides.** (French.) R. Rieffel and J. Danquigny. *Chaleur & Industrie*, v. 36, no. 356, Mar. 1955, p. 73-94.

Methods of sampling coke and coal. Tables, graphs. (To be continued.)

9141 Fluid Coking and Fluid Coke. Frank T. Barr and C. E. Jahnig. *Chemical Engineering Progress*, v. 51, Apr. 1955, p. 167-173.

Finely divided dry "fluid coke" is produced from heavy bottoms (residuum). Tables, graphs, diagram, photographs, micrograph. 3 ref.

9142* New Paths in Smokeless Fuel Production. W. Idris Jones. *Chemical & Process Engineering*, v. 36, Apr. 1955, p. 147-151.

Low-rank coals are used in a fluid-bed process similar to catalytic oil cracking. Tables, graphs, diagrams.

9143 The Infrared Spectra of Coals. J. K. Brown. *Chemical Society, Journal*, 1955, Mar., p. 744-752.

Twelve vitrains of British coals are examined. Tables, graph, infra-red spectra. 28 ref.

9144 Infrared Studies of Carbonised Coals. J. K. Brown. *Chemical Society, Journal*, 1955, Mar., p. 752-757.

British coking coal is studied while heated to 800 C. Region of greatest interest is from 400 to 550 C. Infra-red spectra. 8 ref.

9145* Self-Cleaning Centrifuge Effective on Heavy Fuel. *Diesel Power*, v. 33, Apr. 1955, p. 66-68, 93.

Includes table, diagram, graphs.

9146* New Formulas for Calculating Long Distance Gas Lines. **Neue Formeln für die Berechnung von Ferngasleitungen.** (German.) H. Walden. *Energietechnik*, v. 5, no. 1, Jan. 1955, p. 17-21.

Theoretical analysis of factors involved and their interrelation. Tables, graphs. 4 ref.

9147 Radiation and Chemiluminescence From Explosion Flames of Carbon Monoxide. A. S. Leah, J. Godrich, and H. R. S. Jack. *Fuel*, v. 34, Apr. 1955, p. 133-153.

Radiation emitted during the early stages of reaction is largely of chemiluminescent origin. Diagrams, photographs, graphs, tables. 20 ref.

9148 Combustion of Dust Layers in Still Air. L. Cohen and N. W. Luft. *Fuel*, v. 34, Apr. 1955, p. 154-163.

Case of solid-gas reactions and factors in industrial fire hazards. Tables, diagram, photographs, graphs. 9 ref.

9149* Gas Quality Measurement. H. Mellors. *Gas Journal*, v. 282, Apr. 13, 1955, p. 103-106.

Determines calorific value, hydrogen sulphide content, and specific gravity. 16 ref.

9150* Industrial Controls in the Use of Gas. I. M. Perl. *Gas Journal*, v. 282, Apr. 13, 1955, p. 107-109; disc., p. 109.

Single- and multi-burner, and weep controls; thermostatic-safety and electric-gas control combinations.

9151* A New Conical Burner Body. Gilbert C. Whitney, Jr. and J. Clark. *Heat Engineering*, v. 30, Mar.-Apr. 1955, p. 36-39.

Development of a pulverized coal burner which would provide uniform distribution regardless of inlet conditions. Diagrams, photograph.

9152 Kinetics of Carbon Gasification. C. W. Zielke and Everett Gorin. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 820-825.

Direct thermal reaction of H with char at 1500 to 1700 F may apply to production of high B.t.u. gas. Tables, graphs. 9 ref.

9153 Burning Velocity of Unconfined Turbulent Flames. Theory of Turbulent Burning Velocity. Experiments With Butane-Air and Methane-Air Flames. Kurt Wohl and Leon Shore. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 825-834.

Work by Scurlock and Grover, Karlovitz, Denniston, and Wells is expanded. Tables, graphs, schlieren photographs. 23 ref.

9154* Problems in the Chemistry and Chemical Utilization of Coal. H. H. Storch. *Institute of Fuel, Journal*, v. 28, Apr. 1955, p. 154-163.

Includes tables, infra-red spectra, graphs. 32 ref.

9155* The Designation of the Fineness of Pulverized Brown Coal. F. A. Bull. *Institute of Fuel, Journal*, v. 28, Apr. 1955, p. 163-170.

Use of the specific surface is proposed as a means of specifying the fineness of samples and a formula is derived for calculating the extent of this surface from the sieving analysis. Tables, graphs. 11 ref.

9156 Automatic Temperature Control of Oil- and Gas-Fired Furnaces. Leo Walter. *Metal Treatment and Drop Forging*, v. 22, Apr. 1955, p. 150-152.

Available methods; their selection and requirements. Circuit diagram, graphs.

9157* Some Physical and Chemical Properties of Coal. J. Ivon Graham. *New Zealand Journal of Science and Technology*, v. 36, sec. B, no. 5, Mar. 1955, p. 464-478.

Relation of properties to the practical problems of firedamp emission, weathering, and spontaneous heating. Tables. 31 ref.

9158 Motor Fuel Symposium. *Petroleum Refiner*, v. 34, Apr. 1955, p. 107-115.

Includes "Industry Views Motor Fuel Trends", Don S. Rawlings; "Ten Years of Change for Motor Fuel"; "Trends in Automotive Engine Design", Burr J. French. Graphs, tables. 4 ref.

9159* Studies on the Dense-Media Separation Process to Coals. I. Separating Effectiveness of a Drum-Type Separator Using Copper Slag as Medium. (Japanese.) Yoshihiro Yatagai, Hitoshi Hirano, and Junji Iwasaki. *Resources Research Institute, Reports (Japan)*, 1955, no. 20, Mar., 22 p.

Includes tables, graphs, diagrams, photographs. 47 ref.

9160* Industrial Testing of Coke Made From Saar Coal and Semi-Coke. **Essai industriel de coke à base de charbons Sarrois et de semi-coke.** (French.) A. Bouillot, P. Desfossez, Ch. G. Thibaut, A. Serruau, and B. Menuet-Guilbaud. *Revue de métallurgie*, v. 52, no. 1, Jan. 1955, p. 63-79.

Test of consumption in a blast furnace of a coke fabricated from 13% semi-coke and coals of the Saar. Tables, circuit diagrams, diagrams, graphs.

9161 Synthetic Liquid Fuels. Annual Report of the Secretary of the Interior for 1954. I. Oil From Coal. II. Oil From Oil Shale. *U. S. Bureau of Mines, Report of Investigations* 5118-5119, Mar. 1955, 73 and 115 p. (TN21 Un3r)

Annual reports on producing synthetic liquid fuel from coal by gas synthesis and hydrogenation, and the mining of oil shale for synthetic fuel production. Photographs, diagrams, graphs, tables.

9162 Formation and Combustion of Smoke in Laminar Flames. Rose L. Schalla, Thomas P. Clark, and Glen E. McDonald. *U. S. National Advisory Committee for Aeronautics, Report* 1186, 1954, 21 p. (TL521 Un3r)

Factors affecting smoke formation were studied in both diffusion flames and premixed Bunsen flames. Diagrams, graphs, micrographs, photographs. 26 ref.

9163 Effect of Ammonia Addition on Limits of Flame Propagation for Isooctane-Air Mixtures at Reduced Pressures and Elevated Temperatures. Cleveland O'Neal, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3446, Apr. 1955, 32 p. (TL570 Un3t)

Includes tables, diagram, graphs. 14 ref.

Books and Miscellaneous Publications

9164 British Coke Research Association, Conference, Sixth. 30 p. 1953. British Coke Research Assoc., London. (TP336 B77c)

Three papers dealing with the formation of coke, its physical and chemical properties, and combustion and reactivity of C.

See also:

8739 (natural gas analysis)
9122 (fuel supplies for New England)
9761 (fuel wastes utilization)

GEOLOGY AND MINERALOGY

9165* Physical Limits of Glauconite Formation. Preston E. Cloud, Jr. *American Association of Petroleum Geologists, Bulletin*, v. 39, Apr. 1955, p. 484-492.

Limiting factors of formation combines with the general ease of field recognition to make glauconite much more useful in paleoecology than other accessory minerals. Table. 26 ref.

9166 Geochemical Prospecting in Lakes and Rivers. W. J. Wark. *Canadian Mining and Metallurgical Bulletin*, v. 48, no. 516, Apr. 1955, p. 195-198; *American Institute of Mining and Metallurgy, Transactions*, v. 58, 1955, p. 111-114.

Locating anomalous concentrations of base metals by testing natural waters with the organic reagent dithizone. Diagram, graph, photograph. 5 ref.

9167* Synthetic, Purely Ferrous, Hydroxyl Mica. **Iskusstvennaia chisto zhelezistaia gidroksil'naia sliuda.** (Russian.) G. I. Veres, T. B. Merenkova, and I. A. Ostrovskii. *Doklady Akademii Nauk SSSR*, v. 101, no. 1, Mar. 1, 1955, p. 147-150.

Obtained in autoclave at high pressure and temperature; compared with natural biotite. Tables, micrograph. 5 ref.

9168* X-Ray Determination of Electron Distribution in Crystals. **Röntgenographische Bestimmung der Elektronenverteilung in Kristallen. I.** Apparatus and Methods of Measurement. **Apparatur und Messverfahren. II.** Electron Distribution in Rock Salt. **Die Elektronenverteilung im Steinsalz.** (German.) B. Wagner, H. Witte, and E. Wölfel. *Zeitschrift für physikalische Chemie (Frankfurt)*, v. 3, nos. 5-6, Apr. 1955, p. 273-329.

Includes photographs, circuit diagram, tables, diagrams, graphs. 42 ref.

Books and Miscellaneous Publications

9169 Isotope Geology. Kalervo Rankama. 535 p. 1954. McGraw-Hill, New York. (QE33 R16i)

Investigation of geological phenomena by means of stable and unstable isotopes of elements and of changes in their abundance.

See also:

8744 (mineral analysis)
8756 (X-ray diffraction in crystallography)
9068 (geophysical prospecting)

GEOPHYSICS

9170* A Three-Slide Cloud Droplet Sampler. Edward N. Brown and Jack H. Willett. *American Meteorological Society, Bulletin*, v. 36, Mar. 1955, p. 123-127.

Description of the instrument and an example of some of the data. Photograph, diagrams, graphs, micrographs. 10 ref.

9171* A Panoramic Ionospheric Recorder for the Study of Travelling Disturbances in the Ionosphere. L. H. Heisler. *Australian Journal of Applied Science*, v. 6, Mar. 1955, p. 1-6 + 2 plates.

Description of a recorder covering the frequency range 1 to 15 Mc. per sec. with a fast scan of 7½ or 15 sec. Diagram, ionospheric recordings. 4 ref.

9172* Symposium on the Use of Aircraft for Geological Surveying. J. A. Roddick. *Canadian Mining Journal*, v. 76, Apr. 1955, p. 51-53.

Five papers discussing the advantages and disadvantages of the use of aircraft in geological surveying. Photographs, map.

9173* The Lateral Distribution of Various Components in Extensive Air Showers at Sea Level. (English.) Goro Fujioka. *Physical Society of Japan, Journal*, v. 10, no. 4, Apr. 1955, p. 245-249.

Distributions of electrons, μ-mesons, and N-components up to 50 m. from the core in air showers were observed making use of a counter hodoscope. Diagrams, tables, graphs. 8 ref.

9174 Instrumentation for the Continuous Measurement of Certain Ionospheric Echo Characteristics. R. W. Parkinson. *Review of Scientific Instruments*, v. 26, Apr. 1955, p. 319-323.

Method for continuously measuring the polarization and other parameters of radio pulse echoes reflected from the ionosphere. Time varied intensity modulation is employed to resolve split echoes with respect to height of reflection. Diagrams, photographs. 12 ref.

9175 The Spiral Structure of the Galaxy. W. W. Morgan. *Scientific American*, v. 192, May, 1955, p. 42-48.

Includes diagram, photographs.

9176* Airborne Radar for Weather Detection. Donald M. Skidmore. *Sperry Engineering Review*, v. 8, Mar.-Apr. 1955, p. 2-7.

Geophysics

Describes the advantages accruing to commercial aircraft equipped with radar which can "see" the weather ahead and indicate the location and intensity of storm areas. Diagrams.

GRAPHIC ARTS

9177* Relief Plates on Magnesium for Dry Offset .016 to .025. Arthur J. Barlow. *American Printer and Lithographer*, v. 136, Apr. 1955, p. 33-35.

A practical, economical dry offset plate. Photographs.

9178 Elements of Gravure Printing and Paper Requirements. Jules Friedlander. *Gravure*, v. 1, May 1955, p. 21-23, 52.

Conventional rotogravure process and some of the paper requirements for this form of printing. Diagrams.

9179* Influence of Hydrophilic Liquids on the Gelatin of Photographic Emulsions Used in Nuclear Physics. **Influence des liquides hydrophiles sur la gélatine des émulsions photographiques utilisées en physique nucléaire.** (French.) L. Vigneron, J. Génin, and R. Chastel. *Journal de physique et le radium*, v. 16, no. 3, Mar. 1955, p. 179-182.

Includes graphs, diagrams.

9180 Some Theoretical Considerations on Photographic Graininess and Granularity. J. H. Webb. *Optical Society of America, Journal*, v. 45, May 1955, p. 379-388.

Theoretical calculations of statistical fluctuations of density and syzygetic density differences for simplified density patterns when scanned with varied-size apertures. Graphs, tables, diagrams. 16 ref.

9181* Minimum Makeready Through Precision Form Preparation. O. F. Duensing. *Photoengravers Bulletin*, v. 44, Apr. 1955, p. 21-28.

Suggestions to improve the letterpress process.

9182* Some Photographic Copying Methods Useful in Libraries. Karl M. Weigert. *Photographic Science and Technique*, v. 2, May 1955, p. 79-80.

Three quick and cheap methods of making photographic copies of small parts of articles or books. Diagram, photographs.

9183* Results of a Study on Offset Collotype. Harry H. Lerner. *Photographic Science and Technique*, v. 2, May 1955, p. 91-94.

Research indicates it is a practical method for printing in continuous-tone.

9184* Photographic Techniques as Applied to the Study of High-Speed Flow. John F. Darsow. *Photographic Science and Technique*, v. 2, May 1955, p. 97-100.

Includes diagrams, photographs. 4 ref.

9185* Application of Plastics in the Graphic Industry. **De toepassing van kunststoffen in het grafisch bedrijf.** (Dutch.) K. E. C. Buyn. *Plastica*, v. 8, no. 4, Apr. 1955, p. 180-784.

Outlines the uses of synthetics in the printing trade and photography. Photographs, charts. (To be continued.)

9186* The Dow Birmetal Etcher. W. B. Hislop. *Process Engravers' Monthly*, v. 62, Apr. 1955, p. 112-113.

An account of a recent demonstration of the new British machine.

9187* Screen Process Printing. A Progress Report. F. W. Mackenzie. *Process Engravers' Monthly*, v. 62, Apr. 1955, p. 114-117.

Technical aspects; new applications; future.

9188* Colour Terminology. H. M. Cartwright. *Process Engravers' Monthly*, v. 62, Apr. 1955, p. 125, 129, 137.

Difficulties arising from the terminologies peculiar to different industries.

9189* Commercial Photography: Balance in Separation Negatives. George L. Wakefield. *Process Engravers' Monthly*, v. 62, Apr. 1955, p. 129, 131, 133.

Ways in which standardization in the studio may be achieved.

9190* Process Practice: Straight-On Reversal. F. H. Smith. *Process Engravers' Monthly*, v. 62, Apr. 1955, p. 133, 135, 137.

Includes diagrams.

9191* Emulsification of Offset Inks. **Das Emulgieren von Offsetfarben.** (German.) J. H. Bitter. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 21, no. 3, Mar. 1955, p. 85-89.

Influence of paper, printing ink, and dampening solution. Graphs, photograph, table, diagram.

9192* A Modern Laboratory for 16 mm Film. S. P. Solow and E. W. Reichard. *Society of Motion Picture and Television Engineers, Journal*, v. 64, Apr. 1955, p. 174-178.

Includes diagrams, photographs.

HEAT POWER

9193 Pin-Fin Heat-Exchanger Surfaces. W. M. Kays. *ASME, Transactions*, v. 77, May 1955, p. 471-478; disc., p. 478-483.

Test data and difficulties encountered with these surfaces, both in fabrication and in their heat-transfer and flow-friction performance, to illustrate the possibilities and limitations of such surfaces in the design of heat exchangers. Tables, graphs, diagrams. 11 ref.

9194 British Naval Gas Turbines. G. F. A. Trewby. *ASME, Transactions*, v. 77, May 1955, p. 561-584; disc., p. 585-590.

A brief history of development and manufacture; special features of the design; details of the operating experience to date, both ashore and afloat. Photographs, diagrams, graphs, table. 22 ref.

9195 Hydrazine Treats Feedwater. *Chemical Engineering*, v. 62, May 1955, p. 122, 124.

Describes Olin Mathieson's rewarding experience. Photograph.

9196 The Monotube Once-Through Boiler for Conventional or Supercritical Pressures. Arthur T. Hunter. *Combustion*, v. 25, Apr. 1955, p. 57-61.

Includes diagrams, photograph. 8 ref.

9197* Possibility of Introduction of Gas Turbines Into Power Industry. **Einsatzmöglichkeit der Gasturbine in der Energiewirtschaft.** (German.) G. Westhoff. *Energietechnik*, v. 5, no. 1, Jan. 1955, p. 3-15.

Comparative analysis of efficiency of gas and steam turbines; advantages and disadvantages. Drawings, diagrams, tables, photographs. 43 ref.

9198 Dropwise Condensation on a Metal Surface. A Study of Its Durability. H. Hampson. *Engineering*, v. 179, Apr. 15, 1955, p. 464-469.

Presence of a non-condensable gas increases the lives of dropwise surfaces and the cleanliness of the metal surface before the addition of the promoter has a considerable effect upon the life. Micrographs, diagrams, graphs, tables. 18 ref.

9199* An Exploration of the Automotive Gas Turbine. A. H. Beaufrere. *Gas and Oil Power*, v. 50, Apr. 1955, p. 91-94.

Includes photographs, diagram, graphs.

9200 Can Nuclear Energy Drive Interplanetary Rockets? Clifford Mannal. *General Electric Review*, v. 58, May 1955, p. 48-49, 51-52.

An assessment of our present status and the future outlook. Diagram.

9201 Low-Frequency Combustion Stability of Liquid Rocket Motor With Different Nozzles. Sin-I Cheng. *Jet Propulsion*, v. 25, Apr. 1955, p. 163-167.

Investigation of the effect of the deviation of the nozzle flow from being quasi-steady on the stability of L. F. oscillation on liquid propellant rockets. Diagram. 10 ref.

9202* Some Gas Turbine Power Plants in Operation. Leo Walter. *Mechanical World and Engineering Record*, v. 135, Apr. 1955, p. 150-154.

Brief survey of industrial turbines in actual operation. Photographs, diagrams, tables, graph.

9203 The Use of Creep-Resisting Steels in Steam Power Plants. H. W. Kirkby. *Metallurgia*, v. 51, no. 306, Apr. 1955, p. 165-170.
Discusses steels for piping, turbine rotors and blades, and bolts. Graphs, tables. 33 ref.

9204 Coal as a Source of Power for Production of Aluminum. Arthur F. Johnson. *Mining Engineering*, v. 7, Apr. 1955, p. 358-360, 362-363.
Power plants, integrated with coal mines, are the key to low cost power for the electroprocess industries. Graphs, tables, map.

9205* Plant Attacks Silica Problem With Monobed Demineralization. I. B. Dick. *Power*, v. 99, May 1955, p. 82-85.
Includes graph, diagram, photographs.

9206* How to Select f-d, i-d, Fans. George A. Eaton and Robert H. Shannon. *Power*, v. 99, May 1955, p. 88-91.
Fan-design conditions depend on firing method, steam load, flow controls, and chance of fan erosion. Photograph, graphs, tables.

9207 The Design of Small Jet Engines. H. S. Rainbow. *Royal Aeronautical Society, Journal*, v. 59, Apr. 1955, p. 249-258.
Includes graphs, diagrams.

9208* Present State of Development of the Large Gas Engine as a Blowing Engine in Iron and Steelworks. **Entwicklungsstand der Grossgasmaschine als Hüttenwerksgebläse.** (German.) Hans Möhring. *Stahl und Eisen*, v. 75, no. 8, Apr. 21, 1955, p. 474-478.
Present state of development of the large gas engine and its ability to compete with other prime movers. Graphs. 8 ref.

9209 Comparison of Effectiveness of Convection-, Transpiration-, and Film-Cooling Methods With Air as Coolant. E. R. G. Eckert and John N. B. Livingood. *U. S. National Advisory Committee for Aeronautics, Report* 1182, 1954, 17 p. (TL521 Un3r)
Calculations for aircraft and rocket jet propulsion systems. Diagrams, graphs. 12 ref.

9210* Servo-Stabilization of Low-Frequency Oscillations in Liquid Propellant Rocket Motors. (English.) Frank E. Marble. *Zeitschrift für angewandte Mathematik und Physik*, v. 6, no. 1, Jan. 1955, p. 1-34.
Includes diagrams, graphs, table. 8 ref.

Books and Miscellaneous Publications

9211 Gas Turbines for Aircraft. Ivan H. Driggs and Otis E. Lancaster. 349 p. 1955. Ronald Press Co., New York. (TL709 D83g)
Basic thermodynamics; engine cycle analysis; flow of gases through channels and ducts; combustion data; methods for determining engine performance at any operating level; procedure for computing effects of changes due to air bleeds, power extractions, and other factors.

See also:

9158 (combustion in automobile engines)
9269 (fuel control for gas turbines)

INFORMATION—PREPARATION AND DISSEMINATION

9212* Integrated Data Processing Comes to Life. *Automation*, v. 2, May 1955, p. 59-65.
Automation of service to customers brings added dividends to management in the availability of timely business data. Photographs.

9213* Developments in Subject Indexing. B. C. Vickery. *Journal of Documentation*, v. 11, Mar. 1955, p. 1-11.
Advantages and field of use of different indexing techniques. Tables, diagrams. 16 ref.

9214 Survey of Biological Abstracting. Bentley Glass. *Science*, v. 121, Apr. 22, 1955, p. 583-584.
Critical comparison of *Biological Abstracts* with other services is encouraging.

INSTRUMENTATION AND LABORATORY APPARATUS

9215 Performance of Small Herschel-Type Venturi Tubes. P. L. Walker, Jr., R. J. Foresti, Jr., F. Rusinko, Jr., and B. W. McCormick. *A.I.Ch.E. Journal*, v 1, Mar. 1955, p. 125-128.
Characteristics of five different tubes are studied. Graphs, diagrams, photographs. 6 ref.

9216 A Re-Evaluation of Surface Finish. L. Chaney and C. H. Good. *American Society of Mechanical Engineers, Paper* No. 54—A-192, 1955, 9 p. (TJ1 Am35p)
Correlation of surface finish with performance characteristics of machined parts. Effect of size of roughness width cut-off on finish standards. Tables, graphs, diagram.

9217 Gravity Feed Fraction Collector. N. E. Topp and D. D. Young. *Chemistry & Industry*, 1955, no. 16, Apr. 16, p. 426-427.
A simple tubular device suitable for separations of like density. Diagram.

9218* Measurement, Checking, and Continuous Recording of the Viscosity of Fluids. **Jobin and Yvon Ultra-Viscoson Viscosimeter. Mesure, contrôle et enregistrement continu de la viscosité des fluides. Viscosimètre ultra-viscoson de Jobin et Yvon.** (French.) R. Fouché. *Chimie Analytique*, v. 37, no. 2, Feb. 1955, p. 56-57.
Principle, function, and uses of ultrasonic viscosimeter. Diagram.

9219* The Stereograph: An Apparatus for Rapid Determination of Crystal Orientations From Laue Diagrams. **Stéréographe: Un appareil permettant de déterminer rapidement les orientations des cristaux à partir de diagrammes de Lauë.** (French.) Henri Jean Latière. *Comptes rendus*, v. 240, no. 11, Mar. 14, 1955, p. 1237-1238.
Photograph, diagrams. 1 ref.

9220 Positive Displacement Meters. Russell W. Henke. *Control Engineering*, v. 2, May 1955, p. 56-64.
What they do and where they apply. Graphs, photographs, diagrams. 1 ref.

9221 Compensating Instruments for Temperature Changes. Robert Gitlin. *Control Engineering*, v. 2, May 1955, p. 70-77.
Seven basic techniques for compensating inaccuracies. Graphs, diagrams, table.

9222 An Electronic Blood-Count Meter. P. L. Frommer. *Electrical Engineering*, v. 74, May 1955, p. 388-391.
Instrument for both red- and white-cell counts; microscopic-particle counts in general; dust and plankton counts; impurity and colloid counts in chemical solutions. Diagrams. 14 ref.

9223 Data Reduction System for Missile Telemetering. E. M. McCormick. *Electronics*, v. 28, May 1955, p. 126-130.
Flight data telemetered from experimental missiles is decommutated and recorded on punch cards for further study by F.M. data converter and data processing equipment. Designed for F.M./F.M. telemetering, the system also handles pulse-width signals. Photographs, graphs, diagrams.

9224* High-Precision Electric Dynamometers. D. Firth. *Engineer*, v. 199, Apr. 8, 1955, p. 478-480.
Development of the design is described and design considerations for larger dynamometers are examined. Photographs, diagrams, graph. 4 ref.

Instrumentation and Laboratory Apparatus

9225* Wheatstone Bridge for Two Systems of Units. W. H. F. Griffiths. *Engineer*, v. 199, Apr. 15, 1955, p. 516-518.

Description of a Wheatstone bridge designed to measure resistance, to an accuracy of 10^{-4}, in any two of the three systems still in use. Diagrams, photograph.

9226* Gas Measurement With a Gate Valve. C. E. Terrell. *Gas*, v. 31, Apr. 1955, p. 129-136, 139.

Modified valves prove helpful and versatile in gas distribution control. Tables, graphs, photographs, diagrams, map.

9227 A New Particle Size Analyser. M. E. O'K. Trowbridge. *Industrial Chemist and Chemical Manufacturer*, v. 31, Apr. 1955, p. 195-196.

Device automatically relates wt. of fall-out with time. Table, diagrams, photograph.

9228 Methods for Measuring Viscosity Continue to Increase. B. W. Thomas. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 83A-84A.

A review. 11 ref.

9229* Certain Peculiarities of the Transformation of Austenite in the Martensitic and Intermediary Ranges. **Nekotorye osobennosti prevrashcheniia austenita v martensitnoi i promezhutochnoi oblastiakh.** (Russian.) M. G. Lozinskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 11, Nov., p. 36-43 + 4 plates.

9230* Apparatus for Linear Microscopic Analysis. **En apparat för lineär mikroskopisk analys.** (Swedish.) G. Molinder. *Jernkontorets Annaler*, v. 139, no. 3, 1955, p. 174-181.

Apparatus for use in the study of the amount of different constituents of steel, the C content of austenite etc., after different heat treatments. Photograph, tables, graphs. 7 ref.

9231 A Demonstration Fog Chamber. W. H. Slabaugh. *Journal of Chemical Education*, v. 32, May 1955, p. 269-270.

A 12 x 12 in., simple, inexpensive chamber, complete with power supply. Diagrams, circuit diagram.

9232 Small Grating Spectrometer for the Far Infrared Region. Earle K. Plyler and Nicolo Acquista. *Journal of Chemical Physics*, v. 23, Apr. 1955, p. 752-753.

Permits spectral study to 50μ with good resolution with a CsI prism. Infra-red spectra.

9233* Precision Viscometry of Polymer Solutions. J. Kooy and J. J. Hermans. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 417-427.

Measures times of efflux in a capillary with an accuracy of 0.003 sec. Diagrams, circuit diagrams. 17 ref.

9234 A Hydrogen Pirani Leak Detector Using a Charcoal Trap. T. B. Kent. *Journal of Scientific Instruments*, v. 32, Apr. 1955, p. 132-134.

Leak detector suitable for vacuum proving large numbers of components down to 10^{-9} l. μ per sec. Diagrams, graphs. 3 ref.

9235 A Thermocouple Anemometer. R. F. Benseman and H. R. Hart. *Journal of Scientific Instruments*, v. 32, Apr. 1955, p. 145-147.

Can be used over a wide range of temperature and for remote indication with either a recorder or moving coil meter. Graphs, diagram. 8 ref.

9236* Electronic Recording Thermo Balance. (French and English.) Charles Eyraud and Ivan Eyraud. *Laboratoires*, 1955, no. 12, p. 13-20.

Simple, sensitive, and versatile balance, with continuous recording and conditioned atmosphere, overcomes practically all problems of continuous weighing in the laboratory. Graphs, diagrams, photograph, circuit diagram.

9237 The Electron Microscope and Some of Its Industrial Applications. *Machinery (London)*, v. 86, Apr. 15, 1955, p. 805-812.

Discusses uses of the microscope in connection with metallurgical investigations. Micrographs, photographs.

9238 Applications of the Reflecting Microscope. E. M. F. Roe. *Research*, v. 8, Apr. 1955, p. 147-157.

How the particular properties of reflecting microscopes lead to their application in the ultra-violet and infra-red regions. Photograph, diagrams, micrographs. 55 ref.

9239 Automatic Isodose Recorder. M. Berman, J. Laughlin, M. Yonemitsu, and S. Vacirca. *Review of Scientific Instruments*, v. 26, Apr. 1955, p. 328-333.

Apparatus compares signals developed by two detectors and is used to measure and plot distribution of radiation energy produced by X-ray generators. Circuit diagrams, graph. 6 ref.

9240 Microbalance Assembly for Adsorption Studies at Low Temperatures. Raymond Bowers and Earl A. Long. *Review of Scientific Instruments*, v. 26, Apr. 1955, p. 337-341.

Measures adsorption isotherms at liquid He temperatures, gravimetrically. Diagrams, photographs. 5 ref.

9241 Apparatus for Low-Frequency Dynamic Measurement on Polymeric Systems. T. E. Morrisson, L. J. Zapas, and T. W. DeWitt. *Review of Scientific Instruments*, v. 26, Apr. 1955, p. 357-360.

Includes graph, diagrams. 3 ref.

9242 Automatic Recording Torsional Magnetic Susceptibility Balance. G. T. Croft, F. J. Donahoe, and W. F. Love. *Review of Scientific Instruments*, v. 26, Apr. 1955, p. 360-363.

Development of a balance suitable for studying the Haas-van Alphen effect, which records torque and magnetic field continuously while the magnet current is reduced automatically. Diagrams, circuit diagrams, graphs, photograph. 2 ref.

9243 Semi-Micro Calorimeter. Eric Hutchinson and Kenneth E. Manchester. *Review of Scientific Instruments*, v. 26, Apr. 1955, p. 364-367.

To facilitate heats of wetting measurements, a metal calorimeter has been designed and constructed which employs a Pt resistance thermometer and an evacuated dead space to minimize heat losses. Diagrams, photograph, table. 5 ref.

9244 A Self-Excited, Alternating-Current, Constant-Temperature Hot-Wire Anemometer. Charles E. Shepard. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3406, Apr. 1955, 29 p. (TL570 Un3t)

For studying turbojet-engine compressor rotating stall and surge. System capable of measuring flow over a frequency range of 0 to 500 c.p.s. Graphs, diagrams, photograph. 9 ref.

9245* Use of Thermobattery to Measure the Temperature Effect at the Cathode During the Electrolytic Deposition of Metal Powders. **Primenenie termobatarei dlia izmereniia temperaturnogo effekta na katode pri elektroosazhdenii metallicheskikh poroshkov.** (Russian.) D. N. Gritsan, A. M. Bulgakova, and N. N. Bagrov. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 2, Feb. 1955, p. 345-349.

Apparatus utilizes a differential thermocouple; temperature effect not dependent on size of cathode surface. Graphs, tables. 4 ref.

LUBRICATION AND FRICTION

9246 Effects of Shear on Lithium Greases and Their Soap Phase. Theodore A. Renshaw. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 834-838.

Electron microscope shows that greases soften with soap orientation and that turbulence alters soap fibers. Table, electron micrographs. 10 ref.

9247 Stability of Lubricating Greases in Centralized Lubricating Systems. Eldon L. Armstrong and Chester D. Thayer. *Iron and Steel Engineer*, v. 32, Apr. 1955, p. 84-87; disc., p. 87-88.

Includes diagram, tables, graphs, photographs.

9248* The Fluid Bearing and Its Applications. **Le palier fluide et ses applications.** (French.) P. Gérard. *Métallurgie et la construction mécanique*, v. 87, no. 3, Mar. 1955, p. 181 + 4 pages.

Description and industrial possibilities. Diagrams, graphs. 13 ref.

9249* Evaluation Parameters of the Work Capacity of Lubricating Greases in Friction Joints. **Parametry otsenki rabotosposobnosti konsistentnykh smazok v uzlakh treniia.** (Russian.) K. I. Klimov. *Neftianoe Khoziaistvo*, v. 33, no. 3, Mar. 1955, p. 74-78.

Effect of temperature, stress of moving parts, and other factors on lubricant strength. Graphs. 12 ref.

9250* Influence of Solid Particles in Oil on Babbit, Copper-Lead and Aluminium Bearings. *Scientific Lubrication*, v. 7, Apr. 1955, p. 31-34.

Test procedure and results. Tables, graphs. 7 ref.

9251* The Structure of Lubricating Grease. I. E. Puddington. *Spokesman*, v. 19, Apr. 1955, p. 10-12.

37 ref.

9252 Comparison of Performance of Experimental and Conventional Cage Designs and Materials for 75-Millimeter-Bore Cylindrical Roller Bearings at High Speeds. William J. Anderson, E. Fred Macks, and Zolton N. Nemeth. *U. S. National Advisory Committee for Aeronautics, Report* 1177, 1954, 15 p. (TL521 Un3r)

Includes graphs, diagrams, tables. 12 ref.

See also:

9742 (self-lubricating bearings)

MECHANICAL ENGINEERING

9253 Lateral Stability of Bridge Arches Braced With Transverse Bars. (English.) Lars Östlund. *Acta Polytechnica (Civil Engineering and Building Construction Series)*, v. 3, no. 2, 1954, 123 p. (Tl Ac81)

Investigates effects produced by the rigidities and no. of transverse bars, by the torsional rigidity of the arches and by the rise of arches; behavior of a double arch subjected to lateral loads. Graphs, tables, photographs, diagrams. 15 ref.

9254 A Laboratory Grinding Machine for Preparing Test Specimens From Rubber and Other Flexible Products. S. A. Eller and W. K. Gondek. *ASTM Bulletin*, 1955, no. 206, May, p. 70-76.

Versatility of this grinding machine is demonstrated by preparing test specimens from end products, such as automobile tires and tubes, hose, electric cable, flooring materials, protective coatings, belting, and molded items. Photographs, tables. 5 ref.

9255* Experimental Investigation of Self-Oscillations in the Internal Circuit of a Pneumatic Regulator. **Eksperimental'noe issledovanie avtokolebanii vo vnutrennem konture pnevmaticheskogo reguliatora.** (Russian.) E. M. Nadzhafov, A. A. Abdullaev, and Iu. V. Krementulo. *Avtomatika i telemekhanika*, v. 16, no. 1, Jan.- Feb. 1955, p. 27-42.

Includes circuit diagrams, graphs. 3 ref.

9256 It Pays to Use Error Analysis During Design. William Allison. *Control Engineering*, v. 2, May 1955, p. 51-55.

Basic rules plus a tested procedure for thorough error analysis. Diagrams.

9257* Design and Use of the Heat Pump. **Ausführung und Anwendung der Wärmepumpe.** (German.) H. E. Koall. *Elektro-Post*, v. 8, no. 6, Feb. 28, 1955, p. 91-94.

Includes diagrams.

9258* The Development of an Experimental Torsional Vibration Damper Using a Silico-Organic Liquid. **Razrabotka opytnogo obraztsa dempfera krutil'nykh kolebanii s kremniiorganicheskoi zhidkost'iu.** (Russian.) V. Z. Karas' and A. A. Ravkind. *Energeticheskii Biulleten'*, 1955, no. 3, Mar., p. 1-12.

Device to decrease vibrations in diesel and other engines. Graphs, diagrams, table. 6 ref.

9259 New Design Concepts for Machine Members Subjected to Fatigue. W. L. Starkey. *News in Engineering at Ohio State University*, v. 27, Apr. 1955, p. 13-16.

Discusses four concepts which may be used as bases for the design of machine members subjected to cyclic stresses. Graphs, photographs.

9260 How to Choose the Right Centrifugal Compressors for Gas Pipelines. T. C. Heard. *Oil and Gas Journal*, v. 53, Apr. 25, 1955, p. 123-126, 129.

Selecting a compressor to be driven by a combustion gas turbine for gas-pipe-line pumping. Graphs.

9261* Level Controls: Know-How Is Your Best Bet for Troublefree Performance. *Power*, v. 99, May 1955, p. 107-109, 208.

Installation, operation, and application of displacement controllers. Photographs, diagram.

9262* The Stresses in an Aeolotropic Circular Disk. H. F. Cleaves. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 8, Mar. 1955, p. 59-80.

Comprehensive treatment of the generalized plane stress problem under the most general edge loading. Tables, graphs. 7 ref.

9263* Impact Buckling of Deep Beams in Pure Bending. J. F. Davidson. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 8, Mar. 1955, p. 81-87.

Behavior of a slender beam, having slight initial curvature and twist, and bent by impulsive moments of a type tending to produce lateral instability. Graphs, diagram, table. 5 ref.

9264 The Mechanism of Rolling Friction. I. The Plastic Range. II. The Elastic Range. K. R. Eldredge and D. Tabor. *Royal Society, Proceedings*, v. 229, ser. A, Apr. 21, 1955, p. 181-220 + 4 plates.

Describes a study of the friction and surface damage produced when a hard steel sphere rolls between flat parallel surfaces of a softer metal, and the mechanism of rolling friction under conditions where the deformations involved are predominantly elastic. Graphs, diagrams, tables, photographs. 34 ref.

9265 Exact Reduction and Solution by Parts of Equations for Elastic Structures. Börje Langefors. *SAAB Aircraft Company, Technical Notes, SAAB TN* 24, 1953, 9 p. (TL504 Sv23t)

Matrix equations for elastic structures and similar physical systems are established by using elastic and topological properties. 9 ref.

9266* A Resistance-Wire Grid System. Desi D. Vasarhelyi. *Trend in Engineering, (University of Washington)*, v. 7, Apr. 1955, p. 4-9, 14.

A valuable method in solving the problem of mapping deformations without any interruption of the main testing process. Photographs, diagram. 4 ref.

9267* Effects of System Components in Process Control. Peter L. Balise. *Trend in Engineering, (University of Washington)*, v. 7, Apr. 1955, p. 10-14.

The effects of process characteristics may be illustrated by analyzing curves obtainable from a demonstration process. Photograph, diagrams.

9268 On Traveling Waves in Beams. Robert W. Leonard and Bernard Budiansky. *U. S. National Advisory Committee for Aeronautics, Report* 1173, 1954, 27 p. (TL521 Un3r)

Numerical traveling-wave solutions are obtained for some elementary problems of finite uniform beams for which the propagation velocities of bending and shear discontinuities are taken to be equal. Table, graphs. 18 ref.

9269 Design and Performance of Throttle-Type Fuel Controls for Engine Dynamic Studies. Edward W. Otto, Harold Gold, and Kirby W. Hiller. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3445, Apr. 1955, 39 p. (TL 570 Un3t)

Results of an analytical and experimental investigation of the steady-state and dynamic characteristics of three types of throttle-controlled fuel systems. Graphs, diagrams, photograph. 1 ref.

Books and Miscellaneous Publications

9270 Applied Engineering Mechanics. Alfred Jensen. 316 p. 1947. McGraw-Hill, New York. (TA350 J45a)

Mechanical Engineering

Emphasizes problems most commonly occurring in practice in statics and dynamics. Shows close relationship in analytical and graphical solutions.

See also:

8679 (mechanical seals)
9034 (automation in the plating industry)
9076 (automation)
9080 (machine tools electronically controlled)
9224 (electric dynamometers)

METALLURGY

9271* **Extra Low Carbon Stainless Steels.** *Aciers Fins & Spéciaux Français*, 1954, no. 18, Dec., p. 87-89.

Manufacture, corrosion resistance, fabrication properties, and applications. Photographs.

9272* Aluminum and Infra-Red Radiation. **Die Rolle des Aluminiums bei der Infrarotstrahlung.** (German and French.) W. v. Berlepsch-Valendas. *Aluminium Suisse*, v. 5, no. 2, Mar. 1955, p. 64-69.

High reflective property of Al makes it an excellent material for infra-red radiation equipment. Photographs, graphs.

9273 Titanium—The Tough Lightweight. A. Hurlich. *Army Information Digest*, v. 10, May 1955, p. 30-36.

Applications in military equipment. Photographs.

9274 Special Hardenable Iron Developed for Tappets. Herbert Chase. *Automotive Industries*, v. 112, May 1, 1955, p. 52-55.

Development and testing of the hardenable Fe. Micrographs, table, diagram.

9275* Study of Some Austenitic Nodular Cast Irons. **Étude de quelques fontes austénitiques à graphite sphéroïdal.** (French.) Jacques Grilliat. *Fonderie*, 1955, no. 109, Feb., p. 4373-4384.

Composition; mecahnical and physical properties of Ni-Resist. Diagram, micrograph, tables, graph. 12 ref.

9276* Influence of Impurities on the Properties of Sand-Molded Bronzes. **Influence des impureté sur les propriétés des bronzes moulés en sable.** (French.) Pierre-Julien Le Thomas. *Fonderie*, 1955, no. 109, Feb., p. 4392-4396.

Influence of Fe, Mn, Al, S, P, Sb, and As on properties and structure. Graphs, table, micrograph. 29 ref.

9277* Nickel Bronzes. **Note sur les bronzes au nickel.** (French.) *Fonderie*, 1955, no. 110, Mar., p. 4438-4441.

Structure of Cu-Ni-Sn alloys; causes of failure; fusion testing. Tables, diagrams. 4 ref.

9278 Cast High Strength Irons to Standard Stock Sizes and Shapes. Oliver Smalley. *Iron Age*, v. 175, Apr. 21, 1955, p. 100-102.

Microstructure, properties, and applications of Meehanite cast iron. Photographs, microscopes, table.

9279 Some Recent Developments in Stainless Steels. J. I. Morley. *Iron & Steel*, v. 28, Apr. 1955, p. 143-146.

Three ways of meeting the requirement for a high tensile stainless steel. Photograph, graphs, tables. 4 ref. (To be continued.)

9280 Titanium Fabrication Study. *Light Metal Age*, v. 13, Apr. 1955, p. 16 + 4 pages.

Highlights of investigation conducted on various fabrication techniques. Photographs.

9281 Titanium Bolts for Aircraft. *Light Metal Age*, v. 13, Apr. 1955, p. 18-19.

Light-wt. Ti bolts equal or exceed performance of present-day, high-strength aircraft bolts. Table, graph, photographs.

9282 Structural Design With Formed Aluminium Sheet. III. Cedric Marsh. *Light Metals*, v. 18, Apr. 1955, p. 124-127.

Discussion of various sections made from formed sheet and their design to prevent failure. Graphs, tables.

9283* Manganese-Titanium Pearlitic Malleable Cast Iron. **Margantsovistotitanistyi perlitnyi kovkii chugun.** (Russian.) P. P. Berg and N. D. Titov. *Liteinoe Proizvodstvo*, 1955, no. 3, Mar., p. 9-10.

Influence of varying amounts of Ti and Mn additions on the structure and properties of cast iron; heat treatment conditions. Graph.

9284 Wrought Stainless Steel. Basil T. Lanphier. *Machine Design*, v. 27, May 1955, p. 183-190.

Machinability; hot and cold working; forging; cutting and shearing; stamping; deep drawing; welding; brazing; soldering; finishing. Tables, photographs.

9285 Gray Iron. C. F. Walton. *Machine Design*, v. 27, May 1955, p. 190-193.

Castability; section sensitivity; machinability; finishing; specifications. Tables, photographs, graph.

9286 Malleable Iron. James H. Lansing. *Machine Design*, v. 27, May 1955, p. 194-196.

Castability; tolerances; machinability; standards. Table, photographs.

9287 Cast Steel. Charles W. Briggs. *Machine Design*, v. 27, May 1955, p. 196-202.

Castability; tolerances; weldability; machinability. Graphs, tables, photographs. 3 ref.

9288 Cast Stainless Steel. E. A. Schoefer. *Machine Design*, v. 27, May 1955, p. 203-205.

Machinability; welding procedures; heat treatment. Photographs, tables.

9289 Wrought Aluminum Alloys. T. F. McCormick. *Machine Design*, v. 27, May 1955, p. 213-219.

Heat treatment; cold forming; machinability; extrusion; forging; welding; brazing; soldering; finishing. Photographs, table.

9290 Cast Aluminum Alloys. G. W. Birdsall. *Machine Design*, v. 27, May 1955, p. 220-227.

Castability; machinability; weldability; finishing. Photographs, tables.

9291 Magnesium Alloys. Paul L. Filter. *Machine Design*, v. 27, May 1955, p. 228-231.

Castability; formability; machinability; weldability; finishing characteristics. Photographs, tables.

9292 Commercial Zirconium. John L .Everhart. *Materials & Methods*, v. 41, Apr. 1955, p. 112-115.

Physical and mechanical properties, corrosion resistance, fabrication, and applications. Photographs, tables, graph. 7 ref.

9293 Metals for Short Time Service at High Temperatures. Alan Levy. *Materials & Methods*, v. 41, Apr. 1955, p. 117-132.

Selection problems and the materials most suitable for turbojet afterburners, ramjet engines, and rockets. Photographs, graph, tables, diagrams.

9294 Aluminium Casting Alloys. *Metallurgia*, v. 51, no. 306, Apr. 1955, p. 171-174.

Particular reference to alloys of B.S. 1490:1949 and to the Al-Zn-Mg alloys. Tables.

9295 Reclaiming Zirconium Chips for Arc-Melting Feed Stock. *Metallurgia*, v. 51, no. 306, Apr. 1955, p. 179-180.

Removal of cutting oils, adhered contaminants, and O contamination; preparation of melting stock; arc melting of ingots. Tables.

9296* High Strength Cast Irons Without Special Elements. **Les fontes résistantes exemptes d'eléments spéciaux.** (French.) J. Pascal. *Métallurgie et la construction méchanique*, v. 87, no. 3, Mar. 1955, p. 173, 175, 177, 179.

Bibliography on techniques of producing high strength castings. (To be continued.)

9297 A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging*, v. 22, Apr. 1955, p. 167-174.

Defines "pigging-up" to "Pt-W alloy". Diagrams, photographs, tables. (To be continued.)

9298* Correct Design of Machine Elements From the Point of View of Foundry Technology, With Special Regard to Steel Castings. **Gépelemek öntéstechnikailag helyes szerkesztése, különös tekintettel az acélöntvényekre.** (Hungarian.) Géza Jándy. *Öntöde*, v. 6, no. 3, Mar. 1955, p. 47-54.

Factors, to be considered in designing, are composition, wall thickness, tensile strength, bend resistance, hardness and shrinkage of the casting; weldability and forgeability of steel castings. Tables, graphs, diagrams.

9299 Modern Steels for Plastic Moulds and Hobs. R. Groves. *Plastics*, v. 20, Apr. 1955, p. 127-128.

Steel molds and hobs in the plastic industry. Tables.

9300* Electrical Spotlight Focuses on Aluminum. *Power*, v. 99, May 1955, p. 76-77.

Applications and problems in switchgear, transformers, distribution, and rotating machines. Photographs.

9301* The Platinum Metals. **Les métaux de la mine du platine.** (French.) Albert Portevin. *Revue de métallurgie*, v. 52, no. 3, Mar. 1955, p. 173-178.

Survey of development, extraction, refining, production, characteristics, and uses of Pt. Tables. 2 ref.

9302* Structure, Mechanical Behavior, and Standardization of Gray Cast Iron in the Light of a Bivariant System. **Die Struktur, das mechanische Verhalten und die Normung des Graugusses im Lichte eines divarianten Systems.** (German.) A. Collaud. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 21, no. 3, Mar. 1955, p. 65-76.

Theoretical and experimental investigation of composition and heat treatment and their influence on physical properties of gray cast iron. Tables, diagrams. (To be continued).

9303* The Significance of Flow Phenomena in the Iron and Steel Industry. **Die Bedeutung der Strömungstechnik in der Eisenhüttenindustrie.** (German.) Michael Hansen. *Stahl und Eisen*, v. 75, no .7, Apr. 7, 1955, p. 401-410.

Important occurences of flow conditions in pig iron and steel, in furnaces used for hot shaping, supply lines, cooling, drying and ventilating apparatus. Diagrams, graphs, photographs, micrographs, table. 19 ref.

9304 The Manufacture of Blades, Buckets and Vanes for Turbine Engines. A. T. Colwell. *Steel Processing*, v. 41, Apr. 1955, p. 215-228, 253.

Methods of manufacture and the materials used. Photographs, tables.

9305* Tool Steels and Their Application. R. F. Spillett. *Tool Engineer*, v. 34, May 1955, p. 71-77.

Deals with heat treating, composition, and uses of tool steels. Photographs, diagrams, graph, tables.

9306 A High Strength Zirconium Alloy: Zirconium - 4 w/o Tin - 1.6 w/o Molybdenum. W. Chubb, G. T. Muehlenkamp, and G. K. Manning. *U. S. Atomic Energy Commission, BMI-987*, Mar. 18, 1955. 26 p. (UF767 U36b)

A heat-treatable, ternary alloy Zr is readily rolled at 800 C and has more than four times the creep strength of pure Zr at 500 C. The alloy is harder in the air-quenched condition than as water quenched. The behavior was found to be associated with a reaction similar to age hardening. In the annealed condition, the strength of the alloy is insensitive to minor compositional changes. Graphs, tables, micrographs.

9307 An Improved Method of Oxy-Fuel Combustion. E. H. Roper. *Welding Journal*, v. 34, Apr. 1955, p. 337-344.

Higher heat release and higher gas velocity, than that previously used commercially, is reported for improved type of oxy-fuel gas burner. New concepts of welding, cutting, flame hardening, and descaling. Diagrams, photographs, tables.

9308* Titanium's Future Looks Bright Despite Major Roadblocks Now Being Overcome. Walter L. Finlay. *Western Metals*, v. 13, Apr. 1955, p. 48-50.

Discussion of the scarcity, technical difficulties, design properties, and cost. Photographs, graphs, tables.

9309* Chromium Alloys With Pt, Ir, Rh, and Ru. **Die Legierungen des Chroms mit Platin, Iridium, Rhodium und Ruthenium.** (German.) Ernst Raub and Werner Mahler. *Zeitschrift für Metallkunde*, v. 46, no. 3, Mar. 1955, p. 210-215.

X-ray and microscopic investigation of alloy formation. Crystal structure and physical properties. Tables, graphs, micrographs. 4 ref.

Books and Miscellaneous Publications

9310 Titanium in Iron and Steel. George F. Comstock. Alloys of Iron Research, New Monograph Series. 294 p. 1955. John Wiley & Sons, New York. (TN757.T5 C73ti)

Effect of Ti on properties and behavior of carbon and alloy steels and cast iron.

9311 Electrons, Atoms, Metals and Alloys. William Hume-Rothery. Rev. Ed. 387 p. 1955. Philosophical Library, New York. (TN690 H88e2)

Structures of atoms and nuclei; at. structure of metals and alloys. Electronic basis of physical properties.

See also:

9010 (power rectifiers in metallurgy)
9203 (use of creep-resisting steels)
9589 (industrial control by ultrasonic equipment)

METALS—EXTRACTION AND REFINING

9312* Design and Operation of Reactors for Titanium Production. (English.) L. Gillemot. *Acta Technica Academiae Scientiarum Hungaricae*, v. 10, nos. 1-2, 1955, p. 221-245.

Discusses unique features of the reactor, conditions and temperature required, and the problem of optimum recovery. Diagrams, photographs, graphs, tables. 15 ref.

9313 Applications in the United States for Some European Improvements in the Blast Furnace Field. Daniel Petit. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 3 p. (TN716 Am35p)

Suggestions for using recent European improvements in coking equipment and blast furnace stoves. Table.

9314 Blast Furnace Stove Cleaning. L. R. Robinson. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 4 p. (TN716 Am35p)

Cleaning methods and costs; effects on production economics.

9315 Statistical Evaluation of Open Hearth Production Factors. E. J. Sobey and R. E. Minto. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 5 p. (TN716 Am35p)

Studies of the efficacy of using hot metal; effects of production factors on melt quality. Graphs.

9316 Use of Open Hearth Slag in Blast Furnaces, and Effect on Open Hearth Practices. E. B. Speer. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 5 p. (TN716 Am35p)

Development of practices that permit use of large quantities of slag in a blast furnace, and subsequent use of the hot metal in an open-hearth furnace. Table, graphs.

9317 One Hundred Per Cent Sinter Burden at Gary Works. R. W. Sundquist. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 11 p. (TN716 Am35p)

Production runs proved that a blast furnace can be operated successfully and efficiently on a burden of 100% sinter. Tables, diagram, graphs. 11 ref.

Metals—Extraction and Refining

9318 A Report on Solid Movement in Blast Furnace Models. J. B. Wagstaff. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 23 p. (TN716 Am35p)

Movement of the stock column in the blast furnace was investigated by the use of two models, a thin slice model and a semicircular one. Diagrams, photographs, graphs. 11 ref.

9319* Determining the Melting Range of Several Commercial Ferroalloys. **Bestimmung des Schmelzbereichs einiger technischer Ferrolegierungen.** (German.) Hans Brendecke and Franz Pawlek. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 125-126.

Melting temperature determinations on eight types. Table, diagram. 3 ref.

9320* The Metallurgy of the Blast Furnace. **Zur Metallurgie des Hochofens.** (German.) *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 179-181.

Effects of C, Mn, S, and Si at various temperatures. Graphs.

9321 The Role of Sulphur in Iron and Steel Making. T. P. Colclough. *Blast Furnace and Steel Plant,* v. 43, May 1955, p. 502-507.

Control of the distribution of S is one of the most important factors in blast furnace operation. Tables.

9322* Ingots and Ingot Production. I. Ingot Structure and Blowhole Formation. G. Reginald Bashforth. *British Steelmaker,* v. 21, Apr. 1955, p. 116-119, 121.

Necessity of accurate control during the final stages of refining prior to tapping. Ingot structure and the mechanism of solidification; factors influencing blowhole formation. Diagrams, photographs. 27 ref.

9323 Experiments on the Melting of Pure Iron in High Vacuum. F. Wever, W. A. Fischer, and H. Engelbrecht. *Henry Brutcher Translation No.* 3438, 19 p. (Slightly condensed from *Stahl und Eisen,* v. 74, no. 23, 1954, p. 1515-1521.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 2559, v. 4, Feb. 1955.

9324 Smelting of Ore—Coal Briquets in the Low-Shaft Furnace. E. E. Hofmann. *Henry Brutcher Translation No.* 3470, 9 p. (Slightly abridged from *Stahl und Eisen,* v. 74, no. 23, 1954, p. 1464-1468.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 2556, v. 4, Feb. 1955.

9325* Analysis of Performances of Blast Furnaces. **Analyse des performances des hauts fourneaux.** (French.) Ch. G. Thibaut. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 3, 1955, p. 563-582.

Various correlations between fuel consumption and other characteristics of the blast furnace. Tables, graphs. 12 ref.

9326* Examination of Histograms on the Behavior of Converter Bottoms. **Examen des histogrammes de tenue des fonds.** (French.) DeLong. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 3, 1955, p. 591-596.

Comparison of lining practice and experience at 16 French steel plants. Graphs, tables.

9327 Preliminary Investigation of Hafnium Metal by the Kroll Process. H. L. Gilbert and M. M. Barr. *Electrochemical Society, Journal,* v. 102, May 1955, p. 243-245.

A discussion of the process from oxide to metal stages is given with thermodynamic values for chlorination and reduction. Metal produced to date is hot malleable but not cold ductile. Photographs, table. 13 ref.

9328 Melt-Quality Tests for Light Alloys. J. Wood. *Foundry Trade Journal,* v. 98, Apr. 14, 1955, p. 397-400.

Test criteria are simple and easy to operate, give results quickly, must be accurate and inexpensive. Photographs, diagram. 3 ref.

9329 Separation of Soda Slag From Hot Metals. C. E. A. Shanahan. *Iron & Steel,* v. 28, Apr. 1955, p. 123-127.

Describes an investigation of the rate at which soda slag separates, by flotation, into a surface layer after the metal addition, and the devising of methods suitable for efficiently separating the surface slag phase from the metal. Diagram, tables, graph. 3 ref.

9330 Oxygen Steel Produced at Dofasco Can Compete With Open Hearth. F. J. McMulkin. *Journal of Metals,* v. 7, Apr. 1955, p. 530-534.

Describes the new plant, new practices, vessels and lining, temperature control, flux and slag control, and final steel analysis. Diagrams, photographs, graphs.

9331 Use of Open Hearth Slag in Blast Furnace Results in Recovery Economies. Edgar B. Speer. *Journal of Metals,* v. 7, Apr. 1955, p. 535-537.

Practices developed which permit usage, with no adverse effect on finished steel analyses or quality. Photograph, graphs, tables.

9332 Anatomy of the Open Hearth. John S. Marsh. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Apr. 1955, p. 545-554.

Discussion about parts of furnaces, their behavior, and their functions. Tables, graphs, diagrams. 5 ref.

9333* Studies on the Improvement of the Hydrometallurgy of Gold and Silver Ores. (Japanese.) Renpei Sei, Hideo Akutsu, and Giichi Nishikido. *Resources Research Institute, Reports (Japan),* 1955, no. 19, Mar., 27 p.

Results of a cyanidation test on the Au and Ag ores from Oguchi mine, in Japan. Graphs, tables. 3 ref.

9334* Deoxidation of the Bath in a Basic Electric Arc Furnace. **Evolution de l'oxygène au four électrique basique à arc.** (French.) S. Piérard and P. Flament. *Revue de métallurgie,* v. 52, no. 1, Jan. 1955, p. 5-26; disc., p. 26-27.

Methods of deoxidizing the bath and slag of smelting furnaces to improve the quality of steel. Diagram, graphs, tables, micrographs. 10 ref.

9335* The Decarburization in the Basic Open-Hearth. **La décarburation au four Martin basique.** (French.) M. Urbain and P. Flament. *Revue de métallurgie,* v. 52, no. 3, Mar. 1955, p. 170-187; disc., p. 187-189.

Carbon-oxygen equilibrium; calculation of the partial pressures of CO; N and H evolution. Graphs, tables. 14 ref.

9336* Use of Gases in Metallurgy and the "Gazal" Process. **La gazométallurgie et le procédé gazal.** (French.) E. Spire. *Revue universelle des mines,* v. 11, ser. 9, no. 3, Mar. 1955, p. 111-120.

General discussion of use of gases in preparation of metals. Application of "Gazal" process, consisting of the injection of a gas into liquid metal through a porous refractory plug, in the desilication, denitration, and desulfurization of cast iron, and desulfurization of steel. Diagrams, photographs, graphs, tables. 15 ref.

9337* On the Equilibrium Among Silicon in Molten Iron, Blast Furnace Slag and H_2-H_2O Mixed Gas. III. Investigation of the Equilibrium of the Reaction (SiO_2) CaO-Al_2O_3(Sat.) + $2H_2 = Si + 2H_2O$. (English.) Koji Sanbongi. *Science Reports of the Research Institutes, Tōhoku University,* ser. A, v. 6, no. 6, Dec. 1954, p. 605-613.

Experiments on the equilibrium of the reducing reaction of SiO_2 in molten iron by H_2. Tables, graphs, diagram. 11 ref.

9338* Drive and Control of Blast-Furnace Turbo-Blowers. **Antrieb und Regelung der Kreiselgebläse für Hochofen-Windverdichtung.** (German.) Werner Runte. *Stahl und Eisen,* v. 75, no. 8, Apr. 21, 1955, p. 461-474.

Prime movers and operation characteristics. Graphs, photographs, diagrams.

9339* Magnet and Box Type Charging Cranes of Modern Design for the Scrap Yard of an Open-Hearth Steel Plant. **Muldenmagnetkrane für den Schrottplatz eines Siemens-Martin-Stahlwerkes in neuzeitlicher Bauweise.** (German.)

Otto Berck and Karl Heinz Hüser. *Stahl und Eisen*, v. 75, no. 8, Apr. 21, 1955, p. 499-502.

Requirements to be met by scrap handling cranes. Design and operation of the cranes. Photographs, diagrams, tables, graphs. 4 ref.

9340 Sinter Makes Blast Furnace News. *Steel*, v. 136, May 9, 1955, p. 88, 90-91.

Some advantages of a 100% sinter-ore charge in blast furnace operation. Photographs.

9341* Investigation of the Reduction of Iron Oxides by Graphite. **Issledovanie vosstanovlenia okislov zheleza grafitom.** (Russian.) V. I. Arkharov, V. N. Bogoslovskii, M. G. Zhuravleva, and G. I. Chufarov. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 2, Feb. 1955, p. 272-279.

Vacuum reduction performed at various temperatures, and the dependence of the Wüstite lattice parameter on degree of reduction. Graphs. 10 ref.

See also:

8647 (blast furnace refractories)
9647 (sintered iron use in blast furnace)
9652 (blast furnaces charges of iron coke)

METALS—FINISHING, POLISHING, AND CLEANING

9342* Influence of the Curvature of the Microprofile of a Surface on the Electrochemical Polishing of Metals. **Vliianie krivizny mikroprofilia poverkhnosti na elektrokhimicheskuiu polirovku metallov.** (Russian.) S. I. Krichmar. *Doklady Akademii Nauk SSSR*, v. 101, no. 2, Mar. 11, 1955, p. 297-300.

Mathematical treatment; calculation of polishing time. Table, graph. 4 ref.

9343 Progress in Barrel Finishing. I. The Development and Technique of Barrel Finishing. C. J. A. Kellard. *Electroplating and Metal Finishing*, v. 8, Apr. 1955, p. 149-152.

Modern progress with barrel finishing media and compounds and a summary of the effects of operating variables on the process. 4 ref.

9344 Comparative Cleaning by Diphase Cleaners and Alkaline Salts. Lloyd Osipow, Herbert Pine, Cornelia T. Snell, and Foster Dee Snell. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 845-847.

Diphase cleaners were superior; alkaline salts improved with higher temperatures on synthetically soiled steel panels. Tables, graphs. 3 ref.

9345 Proper Handling Devices Aid Batch Pickling. W. A. Risher. *Iron Age*, v. 175, May 12, 1955, p. 95-97.

Design of sling chains, hooks, and fabricated carriers used in batch-type pickling operations. Photographs.

9346 Felt in Metal Finishing. L. D. Gruberg. *Steel Processing*, v. 41, Apr. 1955, p. 237-240.

Precision finishing, grinding, polishing, and buffing operations in the metals industries. Photographs.

METALS—FOUNDRY PRACTICE

9347* The Use of Induction Furnaces for the Melting of Aluminum Alloys. **I forni ad induzione a bassa frequenza nella fusione dell'alluminio.** (Italian.) A. Tagliaferri and C. Barbazanges. *Alluminio*, v. 24, no. 1, Jan. 1955, p. 17-28.

Thermic efficiency of such furnaces. Diagrams, photographs, tables.

9348 Investment Casting. I-III. *American Machinist*, v. 99, Apr. 25, 1955, p. 155, 157, 159.

Methods of controlling pattern shrinkage; larger casting problems; mold cracking. Diagrams.

9349 Continuous Casting of Aluminum in a Grooved Mold. R. Irmann. *Henry Brutcher Translation No.* 2928, 4 p. (From *Giesserei, Technisch-Wissenschaftliche Beihefte*, 1952, nos. 6-8, p. 393-394.) Henry Brutcher, Altadena, Calif.

Occurrence of cold shuts and particulars on the mechanism of formation; relationship between cold shuts and surface tension of molten metal. Photographs, diagrams.

9350 Production of Foundry Cores by the Carbon Dioxide Process and Equipment Needed. W. Saubermann. *Henry Brutcher Translation No.* 3409, 19 p. (Slightly abridged from *Giesserei-Praxis*, v. 73, no. 2, 1955, p. 29-32; no. 3, 1955, p. 49-51.) Henry Brutcher, Altadena, Calif.

Description of the principles of and results obtained with a CO_2 "baking" process, which emphasizes lower costs. Diagrams.

9351* Rational Designing of Castings. **La concezione razionale dei getti.** (Italian.) *Fonderia*, v. 4, no. 2, Feb. 1955, p. 49-59.

Presents ten points to be considered in the designing of quality cast iron pieces. Diagrams, photographs.

9352* Green-Sand Molding of Copper Alloys. **Le moulage à vert des alliages de cuivre.** (French.) Michel Goret and Pierre Delanoy. *Fonderie*, 1955, no. 109, Feb., p. 4385-4391.

Specifications for material and sands to be used. Diagrams, photograph.

9353* Influence of Copper on Cast Irons Containing Magnesium. **L'influence du cuivre sur les fontes contenant du magésium.** (French.) R. M. Lamb. *Fonderie*, 1955, no. 110, Mar.,.p. 4403-4412.

Possibilities of using Cu with Mg in the production of nodular cast iron. Tables, graphs, micrographs.

9354* Functioning of an Average-Size Water-Cooled Cupola. **Fonctionnement d'un cubilot a ruissellement de dimensions moyennes.** (French.) Pierre Hubert. *Fonderie*, 1955, no. 110, Mar., p. 4414-4422.

Describes operating characteristics, and advantages and disadvantages of cupola installed in a cast-iron foundry. Diagrams, tables, graphs, photograph.

9355 Process Engineering in the Foundry Industry. Jerome R. Young. *Foundry*, v. 83, May 1955, p. 104-105.

Emphasizes the importance of process engineers in improving casting quality and increasing economy in foundry operations. Photographs, table.

9356 Foundry Processes. *Foundry*, v. 83, May 1955, p. 106-127.

Trends and new developments in molding, melting, metals, heat treating, and testing. Photographs.

9357 Research Gating Data Finds Practical Use. J. G. Kura. *Foundry*, v. 83, May 1955, p. 108-109.

As a result of research being conducted on gating systems, foundrymen now are in a better position to apply tested principles to solve specific problems. Because the best gating practice is dictated by casting design, foundrymen still must exercise good judgment and, at times, great ingenuity.

9358 Foundry Specializes in Centrifugal Casting. Edwin Bremer. *Foundry*, v. 83, May 1955, p. 130-135.

Products include a wide range of hollow cylindrical tubes which vary in size from 3 to 54 in. in diameter, up to 27 ft. in length, and from 25 to 60,000 lb. in wt. Both ferrous and non-ferrous alloys are cast. Photographs, diagram.

9359 Relationship Between Pouring Temperature, Porosity and Tensile Strength of Sand-Cast Bronze. W. T. Pell-Walpole. *Foundry Trade Journal*, v. 98, Mar. 31, 1955, p. 341-348.

Experimentation on effect of pouring temperature, using metal of controlled gas content, close control of casting variables and molds, and mold castings of selected composition with respect to their capacity for producing hydrogen. Graphs, table. 9 ref.

9360* Surface Tension of Cerium Treated Cast Iron. **Oberflächenspannung des mit Zer behandelten Gusseisens.** (German.) Rudolf Gautschi and Borut Marinček. *Giesserei*, v. 42, no. 6, Mar. 17, 1955, p. 121-123.

Metals—Foundry Practice

Relation between surface tension and the formation of nodular graphite. Influence of Ce addition. Tables, micrograph, diagram. 10 ref.

9361* Study of Combustion in Cupola Furnace. **Eine Studie über die Verbrennung im Kupolofen.** (German.) J. Navarro Alcacer and J. A. de Andrés. *Giesserei*, v. 42, no. 6, Mar. 17, 1955, p. 124-127.

Method and installation used. Tables, graphs, diagrams. 4 ref.

9362* Investigation of Vertical Movements of the Metal When Flowing Into the Mold. **Untersuchung der Vertikalbewegungen des Metalls beim Fliessen in die Form.** (German.) Tung-Ping Yao. *Giesserei*, v. 42, no. 7, Mar. 31, 1955, p. 145-153.

Theoretical analysis of flow; influence of gas pressure, "hydraulic shock effect", and "hydraulic jump effect"; changes in properties of metals during flow. Graphs, diagrams. 7 ref.

9363* Relation Between Viscous and Mechanical Properties of Bentonite. **Über die Zusammenhänge zwischen den viskosen und den mechanischen Eigenschaften der Bentonite.** (German.) Heinz Siegel. *Giesserei*, v. 42, no. 8, Apr. 14, 1955, p. 176-186.

Physical and mechanical properties, possibilities for improvement, and fields of application of bentonite molds. Tables, diagrams, photographs. 8 ref.

9364* A New Sand Mold Binder. **Ein neuer Formstoffbinder.** (German.) Heinz Busch. *Giesserei*, v. 42, no. 8, Apr. 14, 1955, p. 187-191.

Composition; optimum relation between sand and binder; physical and mechanical properties of finished molds. Tables, graphs, photographs. 2 ref.

9365* Further Development of Exothermic Riser Inserts in Steel Castings. **Weiterentwicklung der Anwendung wärmeabgebender Steigereinsätze bei Stahlguss.** (German.) Friedrich Dubielzig and Heinz Kühne. *Giessereitechnik*, v. 1, no. 2, Feb. 1955, p. 13-15.

Changes in composition of the thermic mass; new casting technique. Photographs, table, graphs. 1 ref.

9366* Feeding and Solidification. **Matning och stelnande. V.** Placing and Dimensioning of Feeders. **Placering och dimensionering av matare.** (Swedish.) K. Åkesson. *Gjuteriet*, v. 45, no. 3, Mar. 1955, p. 31-38.

Position, in relation to heat center of casting, and method of determining size of feeders are discussed. Diagrams, table, graph. 4 ref.

9367 Metallurgical Blast Cupola Offers Improved Melting Efficiency. S. T. Jaswinski. *Iron Age*, v. 175, Apr. 21, 1955, p. 87-91.

Combines the operating characteristics of the blast furnace with the low pressure blast and continuous tapping features of the conventional cupola. Photographs, micrographs, tables.

9368 Precision Alloy Steel Castings. *Iron & Steel*, v. 28, Apr. 1955, p. 135-137.

Advantages of the process, structural and mechanical properties, design, and examples of application. Photographs, table, micrograph.

9369 Large, Intricate Shapes Made by Investment Casting. Irvin R. Kramer and Davidlee Von Ludwig. *Materials & Methods*, v. 41, Apr. 1955, p. 106-109.

Frozen Hg technique makes possible castings weighing 80 to 100 lb. and dimensions in excess of 36 in. Diagrams.

9370* NE-Heavy Metal Centrifugal Casting. Development and Requirements for Centrifugal Casting Method. **NE-Schwermetall-Schleuderguss. Ein Beitrag zur Entwicklung und Förderung des Schleudegussverfahrens.** (German.) R. R. Domanowski. *Metall*, v. 9, nos. 7-8, Apr. 1955, p. 291-297.

Discusses process characteristics, mechanical potentials, selection of mold material, technical objectives, advantages, and its recognition in German industrial standards. Tables.

9371 European Vacuum Melting History and Practice. H. H. Scholefield. *Metal Treatment and Drop Forging*, v. 22, Apr. 1955, p. 141-147.

Reviews past achievements and present trends. Diagrams. 10 ref.

9372* Application of Easily Removable Risers on Non-Ferrous Metals Castings. **Letörhető tápfej alkalmazása a fémöntészetben.** (Hungarian.) Márton Solti, Pál Németh, and Gyula Emőd. *Öntöde*, v. 6, no. 3, Mar. 1955, p. 59-63.

Composition and treatment of the separating plates; dimensions of risers that can be broken off. Diagrams, photographs. 3 ref.

9373* Calculating the Gating-Systems Applied in Iron Foundries. **Néhány szó a vasöntészetben használatos beömlőrendszerek számításához.** (Hungarian.) Sándor Vékony. *Öntöde*, v. 6, no. 3, Mar. 1955, p. 63-65.

Problems of temperature, height of casting, dimension of horizontal canal. Diagrams, graphs, tables.

9374 Guide to Ejector Pin Mounting. W. M. Halliday. *Precision Metal Molding*, v. 13, May 1955, p. 45-50.

Effect of ejector design on flash, distortion and inaccuracy, speed of casting, and life and maintenance of die. Diagrams.

9375 Eliminate Leakage of Airborne Castings. Lowell Palmer. *Precision Metal Molding*, v. 13, May 1955, p. 55-58.

Castings are impregnated by three different methods. Table, photographs.

9376* Some Developments in the Art of Casting Metals and Alloys. **Quelques développements dans l'art du moulage des métaux et alliages.** (French.) L. W. Pateman and J. B. Rait. *Revue de métallurgie*, v. 52, no. 1, Jan. 1955, p. 33-46.

Review of some developments in foundry practices; including investment casting, shell molding, and centrifugal casting. Photographs, diagrams, micrographs. 34 ref.

9377* Original and Secondary Defects of Casting. **Původní a druhotné vady odlitků.** (Czech.) Josef Přibyl. *Slévárenství*, v. 3, no. 3, Mar. 1955, p. 69-72.

Causes and analyses of casting defects. Diagrams. 6 ref.

Books and Miscellaneous Publications

9378* **Bibliography on Casting Defects.** 9 p. 1955. American Foundryman's Society, Des Plaines, Illinois. (ZTS236 Am35b)

A selected bibliography dealing with the most important literature references on casting defects.

See also:

9412 (aluminum casting)
9425 (melting practices for high-speed steels)
9763 (air pollution from cupola furnaces)

METALS—HEAT TREATMENT

9379* **Oxyacetylene Flame Hardening.** (English.) *Aciers Fins & Spéciaux Français*, 1954, no. 18, Dec., p. 52-61.

Simple and practical means of effecting localized heating of the surface of metals. Graph, diagrams, photographs, table.

9380* Toughness and Wear-Resistance of Automobile Parts Treated by Gas Cyaniding. **Prochnost' i iznosostoikost' avtomobil'nykh detalei pri gazovom tsianirovanii.** (Russian.) A. M. Tarasov and B. A. Stetsenko. *Avtomobil'naia i traktornaia promyshlennost'*, 1955, no. 3, Mar., p. 21-24.

Cyaniding techniques; micro-structure of treated layer; comparison of gas and liquid processing. Photographs, graphs, tables, micrographs, diagrams. 3 ref.

9381* Steel Castings for Double-Duro Hardening. **Stahlguss für Brennhärtung.** (German.) Hans Wilhelm Grönegress. *Giesserei*, v. 42, no. 8, Apr. 14, 1955, p. 170-175.

Optimum composition; influence of C content on hardenability; heat treatment; fields of casting applications. Photographs, table, graphs, micrographs. 7 ref.

9382 Heat Treatments Standardize Part Structures for Automated Machining Lines. W. J. Behrens. *Iron Age*, v. 175, Apr. 28, 1955, p. 95-97.

The practice of one industrial concern to heat treat all incoming materials in order to establish uniform structure for its high-speed machining operations. Photographs.

9383 Wide Steel Plate Continuously Heat Treated on New Integrated Line. W. D. Latiano. *Iron Age*, v. 175, May 5, 1955, p. 105-108.

The line handles plate to 130-in. wide and 40-ft. long on a continuous basis. Use of major materials handling devices has reduced the overall time required in heat treating operations. Photographs.

9384 Heat Treating of Aluminum. George H. Thurston. *Light Metal Age*, v. 13, Apr. 1955, p. 8-11, 27.

Discusses steps involved and the manner in which they deviate from standard ferrous metals practice. Photographs.

9385* Continuous Muffle-Tube Furnaces. **Les fours continus à tubes-moufles.** (French.) *Métallurgie et la construction mécanique*, v. 87, no. 3, Mar. 1955, p. 209-211.

Application of furnaces in the annealing of soft-steel and stainless-steel tubes, and stainless-steel and refractory wires. Photographs.

9386 Practical Applications of Furnace Atmospheres. Charles A. Mueller. *Metal Treating*, v. 6, Mar.-Apr. 1955, p. 2-7, 28.

Use of endothermic, exothermic, dissociated ammonia, or dry N as atmospheres in heat treating operations. Diagrams, graphs, photograph.

9387 Batch Carbon Restoration Annealing of Bar Stock. H. W. Callahan. *Metal Treating*, v. 6, Mar.-Apr. 1955, p. 10, 12, 14.

Principal heat treatments carried out in a batch controlled atmosphere furnace. Photographs.

9388 Steam Heat Treating Boosts Processing Efficiency. Fred L. Spangler. *Steel*, v. 136, May 9, 1955, p. 82-84.

Temper, anneal and stress relieve in steam atmosphere to get scale-free work. Method imparts wear and corrosion resistance, and reduces finishing operations. Photographs, table.

9389 Equilibrium Curves. Their Application to Furnace Atmospheres. N. K. Koebel. *Steel Processing*, v. 41, Apr. 1955, p. 247-253.

Brief review and comparison of the theoretical equilibrium curves, calculated by means of the phase rule, with the empirical equilibrium curves recently derived by direct measurement methods in industrial furnaces. Graphs. 5 ref.

9390 The Heat Treatment and Working of Haynes 25 Alloy. H. A. Blank, A. M. Hall, J. H. Jackson, J. W. Frank, and W. K. Anderson. *U. S. Atomic Energy Commission, BMI-814*, 1953, 31 p. (UF767 U3b)

Primary objectives were to determine the upper limit of hardness, produced by cold working, at which Haynes 25 alloy can be satisfactorily machined, and the aging conditions that produce the highest hardness in the alloy. Corollary objectives were to improve the alloy's machinability and response to aging, as well as its wear resistance, by adjustment of composition. Graphs, tables, photographs.

9391* The Production of Patented Wire for Valve Springs. O. Page. *Wire Industry*, v. 22, Apr. 1955, p. 411 + 7 pages.

A consideration of the various problems arising, along with an outline of certain methods of overcoming them. Graphs, micrographs, photographs.

METALS—MECHANICAL AND PHYSICAL PROPERTIES

9392 A Large-Deflexion Theory for Thin Plates. E. H. Mansfield and P. W. Kleeman. *Aircraft Engineering*, v. 27, Apr. 1955, p. 102-108.

A theory based on the assumption of an inextensional middle surface of the plate. Diagrams, graphs, photograph. 6 ref.

9393 Energy Theorems and Structural Analysis. I. General Theory. J. H. Argyris. *Aircraft Engineering*, v. 27, Apr. 1955, p. 125-128, 129-134.

Application on energy principles of structural analysis including the effects of temperature and non-linear stress-strain relations. Diagrams, tables. 7 ref. (To be continued.)

9394* The Selection and Treatment of High Speed Steels. W. Sorby. *Alloy Metals Review*, v. 8, Mar. 1955, 9 p.

Tungsten, Cr, Mo, V, and Co, in various combinations, are used to develop abrasion resistance and high hardness characteristics at elevated temperatures. Tables, graphs, micrograph, diagram.

9395* Properties of High Tin Content Aluminum-Tin-Copper Friction Alloys. **Caratteristiche di leghe antifrizione alluminio-stagno-rame, ad alto contenuto di stagno.** (Italian.) N. Collari and L. Paglialunga. *Alluminio*, v. 24, no. 1, Jan. 1955, p. 29-33.

Heat and mechanical treatments required to realize the best integration of the alloying element. Graphs, tables, micrographs. 7 ref.

9396 The Vapor Pressure of Americium Metal. Stephen C. Carniglia and B. B. Cunningham. *American Chemical Society, Journal*, v. 77, Mar. 20, 1955, p. 1502.

Determined between 1103 and 1453 C. 5 ref.

9397 The Determination of Residual Stresses in Hardened, Ground Steel. L. V. Colwell, M. J. Sinnott, and J. C. Tobin. *American Society of Mechanical Engineers, Paper No. 54—A-52*, 1955, 12 p. (TJ1 Am35p)

Residual surface stresses, induced by grinding a hardened SAE 4340 steel, were investigated by means of X-ray diffraction and by optical interferometric methods. Tables, graphs, diagram. 8 ref.

9398 Frictional Characteristics and Surface Damage of Thirty-Nine Different Elemental Metals in Sliding Contact With Iron. Carl L. Goodzeit, Arvid E. Roach, and Richard P. Hunnicutt. *American Society of Mechanical Engineers, Paper No. 54-A-53*, 1955, 10 p. (TJ1 Am35p)

Surface-damage characteristics were related to the relative hardness of the metals in sliding contact, their mutual solubility, and their ability to form intermetallic compounds. Tables, diagram, photographs, micrographs. 11 ref.

9399 Residual Grinding Stresses in Hardened Steel. H. R. Letner. *American Society of Mechanical Engineers, Paper No. 54—A-56*, 1955, 12 p. (TJ1 Am35p)

Residual stresses resulting from surface grinding a hardened ball-bearing-type steel, under closely controlled conditions, were measured by the deflection method, and the effects of wheel grade, unit downfeed, and grinding fluid upon the stresses generated were studied. Graphs, photographs, table, diagram. 6 ref.

9400 Scoring Characteristics of Thirty-Eight Different Elemental Metals on High-Speed Sliding Contact With Steel. A. E. Roach, C. L. Goodzeit, and R. P. Hunnicutt. *American Society of Mechanical Engineers, Paper No. 54—A-61*, 1955, 14 p. (TJ1 Am35p)

Metals that have the best score resistance against steel are the B-subgroup metals which are either insoluble with Fe or else form intermetallic compounds with Fe. Tables, graphs, photographs, diagram. 18 ref.

9401 Effect of Sequence on the Coefficient of Friction in Cold-Drawing Low-Carbon Steel and 2S-O Aluminum Rods. III. H. Majors, Jr. *American Society of Mechanical Engineers, Paper No. 54—A-114*, 1955, 13 p. (TJ1 Am35p)

Average coefficients of drawing friction were determined by Sachs theory and by direct measurement, using SR-4 wire strain gages on the outer surface of the die. Die profiles were determined by plastic castings. Tables, diagrams, graphs, photograph. 18 ref.

9402 Stresses and Strains in Cold-Extruding 2S-O Aluminum. Erich G. Thomsen and Joseph Frisch. *American Society of Mechanical Engineers, Paper No. 54-A-161*, 1955, 20 p. (TJ1 Am35p)

Steady-state particle-velocity vectors were determined from gridded, split billets during incremental extrusion steps. Photographs, diagrams, graphs. 8 ref.

Metals—Mechanical and Physical Properties

9403 A Method of Predicting the Effects of Notches in Uniaxial Fatigue. William E. Dirkes. *American Society of Mechanical Engineers, Paper No.* 54–A-180, 1955, 9 p. (TJ1 Am35p)

Correlates notched and unnotched test data by a semi-graphical method of extrapolating notched test results. Graphs. 9 ref.

9404 Biaxial Plastic Stress-Strain Relations of a Mild Steel for Variable Stress Ratios. Joseph Marin and Ling-Wen Hu. *American Society of Mechanical Engineers, Paper No.* 54-A–243, 1955, 11 p. (TJ1 Am35p)

Experimental checks on the validity of the simple flow theory of plasticity did not support the theory. Graphs. 5 ref.

9405 Design Aspects of High Temperature Fatigue With Particular Reference to Thermal Stresss. L. F. Coffin, Jr. *American Society of Mechanical Engineers, Paper No.* 54-A-252, 1955, 19 p. (TJ1 Am35p)

Design criterion based on experiments carried out on test specimens subjected to constrained thermal cycling and constant temperature strain cycling. Tables, graphs. 20 ref.

9406* Electric Conductivity of Cadmium Selenide. **Ubr die elektrische Leitfähigkeit von Cadmium-selenid.** (German.) K. Hauffe and H. G. Flint. *Annalen der Physik,* v. 15, nos. 3-4, 1955, p. 141-147.

Measurements between 300 and 500 C. Diagrams, tables. 12 ref.

9407* Formation or Preferred Magnetic Orientations by Inhomogeneous Stresses on Magnetostriction Materials. **Erzeugung von magnetischen Vorzugsrichtungen durch inhomogene Spannungen bei Magnetostriktions-Werkstoffen.** (German.) Eduard Houdremont and Otto Rüdiger. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 153-157.

Effect of inhomogeneous stresses due to cold rolling, surface working, bending, and embossing of grooves; detection of preferred orientation by magnetite-powder configurations. Diagrams, graphs, tables, micrographs. 18 ref.

9408* Indication of the Brittleness of Steel by Determining Its Yield Point, Tensile Strength, and Resistance to Necking in Triaxially Stressed Specimens. **Kennzeichnung der Sprödbruchneigung von Stählen durch Messung der Fliessspannung, Reissspannung und Brucheinschnürung an dreiachsig beanspruchten Proben.** (German.) Albert Kochendörfer and Christof Rohrbach. *Archiv für das Eisenhüttenwesen,* v. 26, no. 4, Apr. 1955, p. 213-229.

Method and material used. Composition of steels and heat treatment. Shape of test specimens. Tables, diagrams, photographs. 28 ref.

9409 Contribution to the Knowledge of Pressure Measurements During Metal Deformation. J. Frisch. *ASME, Transactions,* v. 77, May 1955, p. 509-512; disc., p. 512-513.

Mean pressure and radial wall stresses measured during the extrusion of commercially pure Pb. Diagram, graphs. 6 ref.

9410 Errors in Deformation Measurements for Elevated-Temperature Tension Tests. John M. Thomas and John F. Carlson. *ASTM Bulletin,* 1955, no. 206, May, p. 47-51.

Tests illustrate magnitude of errors possible and also additional accuracy of one method of calculating the "effective" gage length for a test specimen with extensometer attachments beyond the reduced section. Photographs, tables, graphs.

9411 On the Process of Fracture of Plastic Metals. Ya. B. Fridman and T. K. Zilova. *Henry Brutcher Translation No.* 2876, 7 p. (From *Doklady Akademii Nauk SSSR,* v. 73, no. 4, 1950, p. 697-700.) Henry Brutcher, Altadena, Calif.

Principal advantages of macromethod; possibility of studying the progress of fracture from the start to the end. Graphs, micrographs, diagram. 6 ref.

9412 Residual Stresses in Continuously Cast Aluminum Bars. G. Seeger. *Henry Brutcher Translation No.* 2916, 11 p. (From *Giesserei,* v. 38, no. 14, 1951, p. 325-329.) Henry Brutcher, Altadena, Calif.

The magnitude of residual stresses can be determined from test pieces, and from the stress distribution, the heat extraction and shrinkage processes during continuous casting are derived.

9413 Wear Caused by Metal-Against-Metal Sliding Friction, With Special Consideration of the Effect of Temperature. I-II. W. Rädeker. *Henry Brutcher Translation Nos.* 3460-3461, 42 p. (Slightly abridged from *Archiv für das Eisenhüttenwesen,* v. 15, no. 10, 1942, p. 453-469.) Henry Brutcher, Altadena, Calif.

Study of wear processes at temperatures ranging from −310 to 1300 F. Graphs, photographs, micrographs. 32 ref.

9414* Enlargement of Rays of Debye-Scherrer Diagrams During the Plastic Deformation of Metallic Crystals. **Sur l'élargissement des raies des diagrammes de Debye-Scherrer lors de la déformation plastique des cristaux métalliques.** (French.) Aurel Berghezan and Jean Hérenguel. *Comptes rendus,* v. 240, no. 12, Mar. 21, 1955, p. 1343-1345.

Describes study on five, regular 99.5% pure Al flakes, subjected to gradual oxidation. Diagrams. 2 ref.

9415* Temperature-Time Dependency of the Strength of Pure Metals. **Temperaturno-vremennaia zavisimost' prochnosti chistykh metallov.** (Russian.) S. N. Zhurkov and T. P. Sanfirova. *Doklady Akademii Nauk SSSR,* v. 101, no. 2, Mar. 11, 1955, p. 237-240.

Relation of life and activation energy to stress. Graphs, table. 19 ref.

9416* Aluminum as a Conducting Material. **Aluminium als Leiterwerkstoff.** (German.) E. Nachtigall. *Elektrotechnik und Maschinenbau,* v. 72, no. 5, Mar. 1, 1955, p. 99-105.

Electric characteristics; influence of impurities; fields of application. Tables, diagrams. 8 ref.

9417* Plastic Strain and Stress Relations at High Temperatures. III. A. E. Johnson, N. E. Frost, and J. Henderson. *Engineer,* v. 199, Apr. 1, 1955, p. 457-458.

Tests made to determine the plastic-strain-stress relations of steel and an Al alloy. Table.

9418 10-Ton Fatigue Testing Machine. H. L. Cox and N. B. Owen. *Engineering,* v. 179, Apr. 22, 1955, p. 500-504.

Describes a mechanical fatigue testing machine of ten ton load range which operates at the resonant frequency of a mass-spring system, at about 2,000 c.p.m. Diagrams, photographs, tables, graphs.

9419 Beams of Metal or Wood Subjected to Millions of Reversals of Compression and Tension ($\sigma_c = -\sigma_t$) or to Longtime Steady Compression Longitudinally. Arthur Buchwald Lamberg. *Franklin Institute, Journal,* v. 259, Apr. 1955, p. 335-344.

Formulas produces dynamic endurance limits which may be used also as static endurance limits.

9420* Changing Modulus of Shear of Tin During Transition From the State of Normal Conductivity to the State of Superconductivity. **Änderung des Schubmoduls von Zinn beim Übergang vom normalleitenden in den supraleitenden Zustand.** (German.) P. Grassmann and J. L. Olsen. *Helvetica Physica Acta,* v. 28, no. 1, 1955, p. 24-32.

Discussion of theoretical analysis, methods of investigation, and equipment used. Table, diagram, drawings. 23 ref.

9421 Intererystalline Fracture of Beta-Brasses Containing Aluminium. E. C. W. Perryman. *Institute of Metals, Journal,* v. 83, Apr. 1955, p. 369-377.

Explanation of the mechanism that causes intergranular failures occurring in binary and ternary β-brasses. Tables, diagram, graphs. 21 ref.

9422 The Effect of Zirconium and Titanium on the Intererystalline-Cracking Tendency of Beta-Brasses. E. C. W. Perryman and R. J. Goodwin. *Institute of Metals, Journal,* v. 83, Apr. 1955, p. 378-382.

Impact-tensile tests and tests under sustained tensile stress in 3% sodium chloride solution were carried out to evaluate the effect of these additions on the tendency to intercrystalline flow and fracture. Tables, graph. 4 ref.

9423 Specific Heat Measurements on Aluminium-4% Copper and Aluminium-4% Copper-Tin Alloys. I. J. Polmear and H. K. Hardy. *Institute of Metals, Journal,* v. 83, Apr. 1955, p. 393-394.

Measurements of the instantaneous apparent specific heat of Al-Cu and Al-Cu-Sn alloys, on heating, showed a heat evolution due to precipitation which, on further raising the temperature, was replaced by a heat absorption due to re-solution. Graphs. 7 ref.

9424 The Slip-Band Extrusion Effect Observed in Some Aluminium Alloys Subjected to Cyclic Stresses. P. J. E. Forsyth and C. A. Stubbington. *Institute of Metals, Journal*, v. 83, Apr. 1955, p. 395-399.

A study of the nature and occurrence of surface debris exhibited along parallel cracks of the crystals. Diagrams. 6 ref.

9425* Effect of the Melting Methods on the Properties of High-Speed Steel. **Vliianie metoda vyplavki na svoistva bystrorezhushchei stali.** (Russian.) Kim Den Son and A. M. Samarin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 11, Nov., p. 27-35.

Use of concentrates of tungstate ores; effect of tungstite on Mn content. Increased Mn content, and heat treatment required. Tables, graphs. 3 ref.

9426* Plastic Deformation of Steel Under Complex Stressing. **Plasticheskie deformatsii stali pri slozhnom nagruzhenii.** (Russian.) A. M. Zhukov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 11, Nov., p. 53-61.

Polyaxial stress-strain relations; divergence of experimental and theoretical results. Tables, graphs, photograph. 5 ref.

9427* The Nominal Cleavage Strength of Steel. **Den nominella klyvningshållfastheten hos stål.** (Swedish.) Tore Norén. *Jernkontorets Annaler*, v. 139, no. 3, 1955, p. 141-153.

Determination by exposing test pieces with weld-deposited brittle surface layers to increasing tensile strength. Diagram, photographs, graphs, table.

9428* The Fracture Mechanism of Steels Intended for Welding. **Brottmekanismen hos stål avsedda för svetsning.** (Swedish.) Cyrill Schaub. *Jernkontorets Annaler*, v. 139, no. 3, 1955, p. 154-173.

Criterion of brittleness transition range of steel. Tables, graphs, diagrams, photographs, micrographs. 12 ref.

9429* The Creep of Metals. **Metallers krypning.** (Swedish.) Erik Nygren. *Jernkontorets Annaler*, v. 139, no. 3, 1955, p. 182-204.

Literature survey regarding the creep of metals. Graphs. 31 ref.

9430 Creep of Aluminum Under Cyclotron Irradiation. M. R. Jeppson, R. L. Mather, A. Andrew, and H. P. Yockey. *Journal of Applied Physics*, v. 26, Apr. 1955, p. 365-367.

Measuring the effect of cyclotron irradiation on the steady-state creep rate of Al. Diagram, graph, table. 8 ref.

9431 Thermoelectric Power and Electrical Resistivity of Dilute Alloys of Silicon in Copper, Nickel, and Iron. C. A. Domenicali and F. A. Otter. *Journal of Applied Physics*, v. 26, Apr. 1955, p. 377-380.

Determines the effects on the thermopower of the neighboring elements, iron, nickel, and copper, when varying amounts of the same foreign atom are dissolved in them. Graphs. 11 ref.

9432 Orientation and Temperature Effects on the Electrical Resistivity of High-Purity Magnesium. James L. Nichols. *Journal of Applied Physics*, v. 26, Apr. 1955, p. 470-472.

Additional insight into the electrical resistivity in terms of improvement of metal purity and verification of existing data on the effect of crystal orientation and temperature on electrical properties of Mg. Graphs, tables. 6 ref.

9433 A Thermodynamic Study of Liquid Metallic Solutions. VI. Calorimetric Investigations of the Systems Bismuth-Lead, Cadmium-Lead, Cadmium-Tin and Tin-Zinc. O. J. Kleppa. *Journal of Physical Chemistry*, v. 59, Apr. 1955, p. 354-361.

High temperature calorimeter determines heat of mixing for the systems. Tables, graphs. 12 ref.

9434* Enrichment of Copper on the Surface of Rolled Steels. **Rézdúsulás hengerelt acélok felületén.** (Hungarian.) Rezső Hantos and Ferenc Boda. *Kohászati Lapok*, v. 10, no. 3, Mar. 1955, p. 123-124.

Determination of low-copper steels for investigation of the causes of surface cracking. Suggestions for avoiding the phenomenon. Tables, photograph, graphs.

9435* Correlation Between the Specific Impact Values Measured in Charpy or Mesnager Specimens. **Összefüggés a Charpy- és Mesnager-próbatesteken mért fajlagos ütőmunka értékei között.** (Hungarian.) Nándor Hajtó. *Kahászati Lapok*, v. 10, no. 3, Mar. 1955, p. 136-137.

Comparison made on the basis of a large no. of tests; results and interpretation. Graph.

9436* Resistance to Coarsening and High-Temperature Stability of Silicon Cast Iron With Nodular Graphite. **Rostoustoichivost' i zharostoikost' kremnistogo chuguna s sharovidnym grafitom.** (Russian.) I. E. Farafonov and Iu. G. Bobro. *Liteinoe Proizvodstvo*, 1955, no. 3, Mar., p. 21-24.

Influence of Si content and alloying elements on physical properties of nodular cast iron. Tables, graphs, micrographs. 7 ref.

9437* Cause of Gas Saturation of Silicon Brass. **Istochniki gazonasyshcheniia kremnistoi latuni.** (Russian.) V. M. Chursin and D. P. Lovtsov. *Liteinoe Proizvodstvo*, 1955, no. 3, Mar., p. 25-27.

Theoretical and experimental investigation of gas formation during smelting; influence of impurities in basic element; gas elimination methods. Drawings, tables, diagrams. 3 ref.

9438* Creep Tests With Variations of Load at Constant Temperature. **Prove di scorrimento con variazioni di carico a temperatura costante.** (Italian.) A. Erra. *Metallurgia italiana*, v. 47, no. 2, Feb. 1955, p. 53-60, 61-62.

Series of creep tests on a Cr-Mo steel having a high creep limit, conducted at 500 C, with various types of load variations after 160 hr. Graphs, tables. 15 ref.

9439* Weldable High Tensile Strength Steels. Wel-Ten. (Japanese.) Fukuji Ogino. *Metals (Japanese)*, v. 25, no. 2, Feb. 1955, p. 85-87.

Studies of notch impact and other strength characteristics, at various temperatures, etc. Graphs, micrographs, tables.

9440 Magnetic Measurement of the Hardness of Metals. D. Hadfield. *Metal Treatment and Drop Forging*, v. 22, Apr. 1955, p. 153-159.

Development during past 20 yr. of various types of instruments designed to measure or compare, magnetically, the hardness value of metals. Photographs, table. (To be continued.)

9441 A General Creep and Recovery Property of Metals. A. J. Kennedy. *Nature*, v. 175, Apr. 16, 1955, p. 674-676.

Mathematics of difference between continuous and discontinuous creep. Graph. 4 ref.

9442* Some Investigations on the Electrical Properties of Hexagonal Selenium. (English.) L. M. Nijland. *Philips Research Reports*, v. 9, Aug. 1954, p. 259-294.

Effects of small amounts of impurities, such as halogens or Tl, on semiconducting properties. Graphs, diagrams, table, micrograph. 37 ref.

9443* Superconductivity of Uranium. John E. Kilpatrick, Edward F. Hammel, and Dillon Mapother. *Physical Review*, v. 97, ser. 2, Mar. 15, 1955, p. 1634-1635.

Various samples of U become superconductors at various temperatures, but the reasons for this behavior are still somewhat obscure. 4 ref.

9444 Oscillatory Thermomagnetic Properties of a Bismuth Single Crystal at Liquid Helium Temperatures. M. C. Steele and J. Babiskin. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 359-367.

Attempts to correlate the thermoelectric power and thermal conductivity of Bi, with its susceptibility, magnetoresistance, and Hall coefficient on exhibiting the same type of magneto-oscillatory behavior. Tables, graphs. 23 ref.

Metals—Mechanical and Physical Properties

9445* Hard Metals of Titanium Carbide for High Temperature Use. **Hartmetalle auf Titankarbidbasis für Hochtemperaturanwendungen.** (German.) K. Pfaffinger. *Planseeberichte für Pulvermetallurgie*, v. 3, no. 1, Feb. 1955, p. 17-33.

Mechanical properties of WZ alloys, with Ni-Co-Cr bonding elements, at temperatures up to 1000 C. Tables, graphs, photographs. 16 ref.

9446* Magnetic Measurements in Tensile Tests. **Mesures magnétiques au cours de la traction.** (French.) P. E. Lagasse. *Revue de métallurgie*, v. 52, no. 1, Jan. 1955, p. 28-32; disc., p. 32.

Method used to study structure changes in metals due to cold working and strain aging. Diagram, graphs, photograph.

9447* The Use of Steels Subjected to Triaxial Stresses at High Temperature. **Note sur l'emploi des aciers coumis à des contraintes triaxiales à haute température.** (French.) W. Siegfried. *Revue de métallurgie*, v. 52, no. 3, Mar. 1955, p. 201-218.

Study of creep resistance of various shapes of gears and turbine blades. Graphs, photographs, diagrams, tables. 4 ref.

9448 Preliminary Experiments on the Temperature-Wave Method of Measuring Specific Heats of Metals at Low Temperatures. D. H. Howling, E. Mendoza, and J. E. Zimmerman. *Royal Society, Proceedings*, v. 229, ser. A, Apr. 5, 1955, p. 86-109.

Reliable results can be obtained in the He range, using apparatus and procedures which are not too complicated. It seems reasonable that the method will still be useful at temperatures below 1 K. Diagrams, graphs. 17 ref.

9449* Correlation Between the Structure and the Mechanical Properties of Gray Cast Irons. **Corrélation entre la structure et les propriétés mécaniques des fontes grises.** (French.) Albert de Sy. *Schweizer Archiv für angewandte Wissenschaft* und Technik, v. 21, no. 3, Mar. 1955, p. 76-80.

Study of tensile strength as a criterion of quality and influence of shape, dimensions, quantity, and distribution of graphite. Diagrams, micrographs.

9450* Influence of Addition of Nickel on the Thermal Expansion, Rigidity Modulus and Its Temperature Coefficient of the Alloys of Cobalt, Iron and Chromium, Especially of Co-Elinvar. I. Additions of 10 and 20 Per Cent of Nickel. (English.) Hakaru Masumoto, Hideô Saitô, and Tatsuo Kôno. *Science Reports of the Research Institutes, Tôhoku University*, ser. A, v. 6, no. 6, Dec. 1954, p. 529-538.

Results of a study on the influence of addition of nickel on the physical properties of the alloys of Co, Fe, and Cr. Tables, graphs. 5 ref.

9451* Magnetic Hysteresis in Annealed Nickel-Cobalt Alloys. (English.) Mikio Yamamoto, Satoshi Taniguchi, and Kinji Hoshi. *Science Reports of the Research Institutes, Tôhoku University*, ser. A, v. 6, no. 6, Dec. 1954, p. 539-550.

Abnormal hysteresis loops may be explained by the occurence of an additional uniaxial anisotropy along the direction of magnetization vectors during annealing. Table, graphs. 20 ref.

9452* Dislocation Theory of the Fatigue Fracture of Ductile Metals. (English.) Francisco Eiichi Fujita. *Science Reports of the Research Institutes, Tôhoku University*, ser. A, v. 6, no. 6, Dec. 1954, p. 565-572.

A proposed dislocation theory to explain fatigue crack or small void, growth of void, generation and propagation of a fatigue crack, etc. Diagrams, graphs. 17 ref.

9453* Experiments to Unify the Scleroscope Hardness Test. **Versuche zur Vereinheitlichung der Rückprallhärteprüfung.** (German.) Hans Schmitz and Wilhelm Schlüter. *Stahl und Eisen*, v. 75, no. 7, Apr. 7, 1955, p. 411-416.

Determination of the scatter range of the individual results of measurement and of the average results from the five single measurements. Graphs, diagram, table. 2 ref.

9454 More Muscles in Steel. Allen G. Gray. *Steel*, v. 136, Apr. 25, 1955, p. 96-99.

Steel, with tensile properties of 260,000 to 280,000 psi. has strength-wt. ratio above the strongest Al and commercial Ti alloys. Table, photographs.

9455 The Prevention of Stretcher Strains. Henri P. Tardif. *Steel Processing*, v. 41, Apr. 1955, p. 241-244, 260, 263.

Machines used for the removal of the yield point of the steel and the consequent prevention of stretcher strain markings upon drawing in a press. Photographs, graphs, table. 30 ref.

9456 A Vapor Pressure Chart for Metals. R. L. Loftness. *U. S. Atomic Energy Commission, NAA-SR-132*, 1952, 9 p. (UF767 Un3.1na)

Although the observed vapor pressure data for a few metals do not fit exactly the values predicted, there is a close enough correlation for most metals to give the chart some utility in estimating vapor pressures of metals. Tables, chart. 4 ref.

9457* Residual Stresses in Surface Layers of Metals, and Wear Resistance. **Ostatochnye napriazheniia v poverkhnostnykh sloiakh metalla i ego iznosostoikost'.** (Russian.) P. E. D'iachenko and T. V. Smushkova. *Vestnik Mashinostroeniia*, v. 35, no. 3, Mar. 1955, p. 38-40.

Influence of residual stress, caused by cold working or machining, on the wear resistance of different steels and cast irons. Graphs. 1 ref.

9458 An Investigation of the Hot Ductility of High Temperature Alloys. E. F. Nippes, W. F. Savage, B. J. Bastian, H. F. Mason, and R. M. Curran. *Welding Journal*, v. 34, Apr. 1955, p. 183S-196S.

Details of construction of a device for determining the effects of testing temperature and prior thermal history on the hot ductility of structural alloys. Diagrams, tables, photographs, graphs, micrographs. 10 ref.

9459* Ferromagnetic Properties of Transition Metal Alloys With Elements of the B-Group. **Beitrag zum Ferromagnetismus von Legierungen der Übergangsmetalle mit Elementen der B-Gruppe.** (German.) Lotte Castelliz. *Zeitschrift für Metallkunde*, v. 46, no. 3, Mar. 1955, p. 198-203.

Investigation of binary and ternary systems. Relation between crystal structure and ferromagnetic properties. Tables, graph. 12 ref.

9460* Effect of Surface-Active Substances on Mechanical Properties of Electrolytic Deposits of Copper. **Vliianie poverkhnostno-aktivnykh veshchestv na mekhanicheskie svoistva elektroliticheskikh osadkov medi.** (Russian.) Iu. S. Tsareva, V. G. Solokhina, N. T. Kudriavtsev, and A. T. Vagramian. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 1, Jan. 1955, p. 166-173.

Comparison of results with organic additions and with pure electrolytes. Graphs, diagram, table. 9 ref.

9461* Thermoelectric Properties of Alloys of the Bismuth-Tellurium System. **Termoelektricheskie svoistva splavov sistemy vismut-tellur.** (Russian.) F. I. Vasenin. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 3, Mar. 1955, p. 397-401.

Data on properties of cast, pressed, and tempered specimens. Table, graphs. 4 ref.

9462* Analysis of the Stressed State in Large Plastic Deformations During the Stretching of Cylindrical Test Pieces With Annular Grooves. **Analiz napriazhennogo sostoianiia, voznikaiushchego v stadii bol'shikh plasticheskikh deformatsii pri rastiazhenii tsilindricheskikh obraztsov s kol'tsevoi vytochkoi.** (Russian.) A. N. Grubin and Iu. I. Likhachev. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 3, Mar. 1955, p. 512-528.

Physical relations between stresses and strains; boundary and contour conditions; data for stress and strain components in plastic range. Diagrams, graphs. 7 ref.

See also:

9259 (cyclic stresses in machine parts)
9264 (hard steel rolling friction mechanism)
9380 (toughness and wear-resistance of metal treated by cyaniding)

9528 (impact toughness of steels)
9556 (effects of deformation on diffusion processes)
9637 (statistical methods in fatigue testing)

METALS—MECHANICAL WORKING

9463* Power Requirement and Forming in Extrusion and Die-Forging. **Kraftbedarf und Fliessvorgänge beim Strangpressen und beim Pressen im Gesenk.** (German.) A. Geleji. *Acta Technica Academiae Scientiarum Hungaricae*, v. 10, nos. 1-2, 1955, p. 187-220.

Verification of the theory of extrusion, formerly established by the author; calculation of forces developed in die-forging. Diagrams, graphs, photographs. 14 ref.

9464 Machining Aluminium. *Aluminium Development Association, Information Bulletin No.* 7, Dec. 1954, 56 p. (TS550 A82i)

Workshop practices used in machining Al and Al alloys. Tables, photographs, diagrams.

9465 Cope Talks on Draw Dies. XXVII. Stainless and Nickel Alloys Require Stronger Draw Dies. Stanley R. Cope. *American Machinist*, v. 99, Apr. 25, 1955, p. 122-124.

Requirements in design of draw dies used for blanking, forming and drawing, and diameter reductions. Tables. (To be continued.)

9466 How to Select Wheels for Grinding Tool Steel. Clifton C. Nickerson. *American Machinist*, v. 99, May 9, 1955, p. 121-125.

Classification of SAE tool steels by their grinding characteristics is the basis for selecting the right grinding wheel. Tables.

9467 Cold Power Spinning Saves Material, Cuts Costs. Kenneth W. Stalker and Kenneth W. Moore. *American Machinist*, v. 99, May 9, 1955, p. 126-131.

Advantages, equipment, lubricants, and procedures for Hydrospinning. Diagrams, photographs, micrographs.

9468 American Machinist Reference Book Sheet. Press Tools for Bending. Don R. King. *American Machinist*, v. 99, May 9, 1955, p. 171-173, 175.

Schematic drawings of press tools serves as a reference guide for intelligent selection of the proper tools. Diagrams.

9469 Cutter Design and Application for Face-Milling Cast Iron and Steel. O. W. Boston and W. W. Gilbert. *American Society of Mechanical Engineers, Paper No.* 54–A-51, 1955, 16 p. (TJ1 Am35p)

Power and cutter life are averaged for various grades of cast iron, tool materials, feed, depth, width of bar, number of teeth in the cutter, and the cutting speed. Table, graphs, diagrams.

9470 The Friction Process in Metal Cutting. Iain Finnie and M. C. Shaw. *American Society of Mechanical Engineers, Paper No.* 54–A-108, 1955, 12 p. (TJ1 Am35p)

It is shown that a coefficient of friction is inadequate to characterize the friction process in cutting, being mainly an indication of the normal stress on the tool face, and thus strongly dependent on the shear process in cutting. Table, graphs, photographs. 18 ref.

9471 Temperature Distribution at the Tool-Chip Interface in Metal Cutting. B. T. Chao and K. J. Trigger. *American Society of Mechanical Engineers, Paper No.* 54-A-115, 1955, 26 p. (TJ1 Am35p)

A rapid, iterative method is presented for computing temperatures. Calculation shows that the maximum temperature occurs at a point near the trailing edge of the contact when chips are produced at conventional feeds and speeds with sintered-carbide tools. Graphs, diagrams, photograph, tables. 27 ref.

9472 The Effect of Wheel-Work Conformity in Precision Grinding. Robert S. Hahn. *American Society of Mechanical Engineers, Paper No.* 54-A-178, 1955, 10 p. (TJ1 Am35p)

Experimental results show that the rate of metal removal varies as the 0.18 power of the curvature difference. Two modes of grinding action are recognized, one in which stock removal is proportional to work speed and independent of wheel speed and the other where the reverse is true. Graphs, diagrams.

9473 The Mechanics of the Simple Shearing Process During Orthogonal Machining. Bernard W. Shaffer. *ASME, Transactions*, v. 77, Apr. 1955, p. 331-336.

Chip formation is analyzed, and analytical expressions are developed for the force required to machine a given material with a tool having a prescribed coefficient of friction. Diagrams, graphs. 14 ref.

9474 A New Approach to Metal-Forming Problems. E. G. Thomsen. *ASME, Transactions*, v. 77, May 1955, p. 515-521; disc., p. 521-522.

Briefly describes the method and gives the stress and strain-rate distribution within a billet during an inverted extrusion process of a tube using commercially pure Pb. Photographs, graphs, diagrams. 4 ref.

9475 Measurement of Cutting Forces. *Automobile Engineer*, v. 45, Apr. 1955, p. 167-171.

Study of cutting phenomena, by measuring the forces involved, is based on the influences of cutting speeds, coolant, heat-treatment, and tool material. Photographs, diagrams, graphs.

9476 Substitutes for Palm Oil in the Cold Rolling of Steel. W. R. Johnson, J. P. Sheehan, and Harry Schwartzbart. *Blast Furnace and Steel Plant*, v. 43, Apr. 1955, p. 415-423.

Development of a substitute lubricant for use in cold rolling of steel. Tables, graphs. 2 ref.

9477 Electrochemcial and Electromechanical Machining of Metals at Low Voltages. V. K. Nevezhin. *Henry Brutcher Translation No.* 2911, 18 p. (From *Elektrichestvo*, 1951, no. 11, p. 62-70.) Henry Brutcher, Altadena, Calif.

Process is based on the erosion of the material of the electrodes under the action of a non-stationary electric discharge. Graphs, diagram, circuit diagram, tables, oscillograms. 2 ref.

9478 Ultrasonic Machining of Holes in Hard Materials. M. M. Pisarevskii. *Henry Brutcher Translation No.* 3484, 7 p. (From *Stanki i Instrument*, v. 25, no. 5, 1954, p. 16-20.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 14695, v. 3, Oct. 1954.

9479* New Constructions in Rolling Mills. **Construction nouvelles dans le domaine des laminoirs.** (French.) Neumann. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 12, no. 3, 1955, p. 609-632.

Safety apparatus for rolling mills and auxiliary equipment. Diagrams.

9480 Electric Spark Machining. Everard M. Williams and C. Paul Porterfield. *Consulting Engineer*, v. 5, Apr. 1955, p. 34-37.

A promising metal-working technique. Photographs, micrographs, diagram.

9481 Precision Finishing Techniques for Magnetic Alloys. A. I. Nussbaum. *Electrical Manufacturing*, v. 55, May 1955, p. 106-111.

Final rolling, slitting, and leveling of high permeability sheet. Diagrams, photographs, graphs, table.

9482 Cold Extrusion Marches On. I. James M. Leake. *Finish*, v. 12, May 1955, p. 27-28, 74.

Reviews history of cold forming; technical description of various phases of the process. Photographs.

9483 Abrasives, Their Use in Surface Preparation. P. C. Bardin. *Industrial Finishing*, v. 31, Apr. 1955, p. 44 + 4 pages.

Describes abrasive application methods, types, and grades. Photographs.

9484 Wrought Carbon and Alloy Steel: Drawing Properties. Carter C. Higgins. *Machine Design*, v. 27, May 1955, p. 158-161.

Requirements and production characteristics. Table, photographs.

Metals—Mechanical Working

9485 Wrought Carbon and Alloy Steel: Machinability. Francis W. Boulger. *Machine Design*, v. 27, May 1955, p. 162-166.

Machinability ratings and machining speeds are given for a number of grades of steel. Variations in composition and properties are discussed in their relationships to machining conditions and surface finish. Table, graphs, micrographs.

9486 Wrought Carbon and Alloy Steel: Forging Characteristics. *Machine Design*, v. 27, May 1955, p. 172-175.

Production characteristics of various steels; guides for selection of forging metal. Tables, photographs.

9487 Wrought Carbon and Alloy Steel: Cold Heading Properties. David H. Samuelson. *Machine Design*, v. 27, May 1955, p. 176-178.

Production procedures; headability ratings for various steels. Tables, photographs, diagrams, graph.

9488 Wrought Carbon and Alloy Steel: Hot Extrudability. Clark Church. *Machine Design*, v. 27, May 1955, p. 179-182.

Advantages of extruded shapes; characteristics of extrudable ferrous and non-ferrous alloys. Photographs, table.

9489 Brass, Bronze and Copper. Arthur I. Heim. *Machine Design*, v. 27, May 1955, p. 205-212.

Stamping; drawing; shearing; forming; bending; cold and hot forging; heading; upsetting; machinability. Tables, photographs.

9490 18 Tips on Practical Stamping Design. Federico Strasser. *Machine Design*, v. 27, May 1955, p. 232-235.

Suggestions for lowering stamping costs. Diagrams.

9491 Milling With Carbide Can Be Profitable. Douglas C. Cunningham. *Machinery*, v. 61, May 1955, p. 161-167.

Advantages and applications of carbide milling tools. Photographs, diagrams.

9492 The Production of Perforated Metal Sheet. *Machinery (London)*, v. 86, Apr. 15, 1955, p. 792-803.

Discusses materials used, production methods, machines, and application of product. Diagrams, photographs.

9493* Deep Drawing Aluminum Alloys. James K. Wareham. *Machine and Tool Blue Book*, v. 50, May 1955, p. 155-167.

Discussion of alloy selection, equipment, tool design, tool finish, and lubricants. Photographs, tables, diagrams.

9494* Skiving. John P. Wright. *Machinist (London)*, v. 99, Apr. 8, 1955, p. 623-630.

What it is and can do; where to use it; how to design and make cutters; ideas in toolholders. Diagrams, photographs.

9495* Chip Control Steps-Up Gear-Shaper Output. J. F. Jones. *Machinist (London)*, v. 99, May 1955, p. 632-633.

A slight change in rake angle gives essential chip-flow control. Photographs, diagrams, graphs.

9496 Machinability of Stainless Steels. *Materials & Methods*, v. 41, Apr. 1955, p. 137.

Effect of tool angle and heat treating on machinability.

9497 Phosphate Coating Retention During Cold Extrusion of Artillery Shells. Lloyd O. Gilbert, Stanley L. Eisler, Jodie Doss, and W. Dennis McHenry. *Metal Finishing*, v. 53, Apr. 1955, p. 56-58, 61.

Use of coatings containing radiophosphorous. Approximately 89% of the coating remained after extrusion. Photographs, tables. 8 ref.

9498* Comparative Examination of Different Systems of Hot Deformation. **Examen comparatif des différents systèmes de déformation à chaud.** (French.) Giovanni Dallapicola. *Métallurgie et la construction mécanique*, v. 87, no. 3, Mar. 1955, p. 197, 199, 201.

Discusses rolling, circular hammering, upsetting of pieces reheated by electrical resistance; forging and stamping of pieces reheated by H.F. induced currents. Micrographs, diagram.

9499* Determination of Characteristics of Static and Dynamic Load in Single-Stand Rough Plate Rolling Mill by Calculation and Experiments. **Über die Ermittlung der Kennwerte der statischen und dynamischen Belastung von eingerüstigen Grobblechwalzwerken durch Rechnung und Versuch.** (German.) Karl-Heinz Lucas and Otto Emicke. *Metallurgie und Giessereitechnik*, v. 5, no. 1, Jan. 1955, p. 7-18.

Theoretical analysis resulting in formulas corroborated by experimental investigation. Diagrams, tables, photographs. 13 ref.

9500* Problem of Static and Dynamic Loads in Rough Plate, Two-High, Reversible Rolling Mills and in Their Drives as a Basis for Their Effective Design and for Determination of Their Efficient Inspection Method. **Zur Frage der statischen und dynamischen Belastung von Duo-Umkehr-Grobblechwalzwerken und ihres Antriebs als Grundlage für ihre zweckmässige Bauweise sowie für die Festlegung wirtschaftlicher Stichprogramme.** (German.) Otto Emicke. *Metallurgie und Giessereitechnik*, v. 5, no. 1, Jan. 1955, p. 19-34.

Structural analysis. Relation between construction details and wear and tear. Diagrams, graphs, tables, photographs. 26 ref.

9501* Factors Influencing the Drilling of Titanium. *Metal-Working*, v. 11, May 1955, p. 20-21.

Discusses type of drill to use, feed and point angles, and general rules for drilling. Graphs, table, photographs.

9502* Factors Affecting Machinability and Tool Wear in Working Copper and Its Alloys. *Metal-Working*, v. 11, May 1955, p. 22-25.

Discusses cutting speed, surface finish, and accuracy of machined work. Tables.

9503* Surface Finish, Dimensional Accuracy and Alteration in Structure of Workpieces Machined by Electric Methods. H. Opitz. *Microtecnic (English Ed.)*, v. 9, no. 1, 1955, p. 14-20.

Methods found for machining even the hardest materials such as stellite, hard metals, and magnetic alloys. Diagrams, micrographs, graphs. 4 ref.

9504* Hydrospinning Aircraft Components. J. A. Logan. *Modern Machine Shop*, v. 27, May 1955, p. 122-123.

Machine tool squeezes cold alloy steels into desired shapes, reducing production time and costs. Photographs.

9505* Forged and Stamped Aluminum Alloy Pieces. **Les pièces forgées et matricées en alliages d'aluminium. I.** Robert Colomb. *Revue de l'aluminium*, v. 32, no. 218, Feb. 1955, p. 167-176.

Obtain one piece parts that are strong, light, impervious to gases and liquids, easy to machine, and highly resistant to corrosion. (To be continued.)

9506* Better Cutting at a Better Price. **"Mieux couper, à meilleur prix".** (French.) H. Bertault and J. P. Hubert. *Revue de la soudure (Brussels)*, v. 11, no. 1, 1955, p. 16-26.

Methods of lowering O and acetylene consumption and improving cutting section in a given period of time. Diagrams, photographs, table.

9507* Method of Measuring the Effectiveness of Cutting Lubricants. **Méthode de mesure de l'efficacité des lubrifiants de coupe.** (French.) P. Eugène. *Revue universelle des mines*, v. 11, ser. 9, no. 3, Mar. 1955, p. 101-110.

Determination and calculation of behavior of cutting fluids under various machining conditions. Diagrams, tables, photographs, graphs. 4 ref.

9508* Tapping Problems Traceable to 16 Machining Conditions. Harry Conn. *Screw Machine Engineering*, v. 16, May 1955, p. 45, 49-49.

Most common machining problems and their solution. Graph, tables.

9509 The Rolling of Metals and Alloys. IV. Resistance to Deformation and Other Factors Which Determine the Magnitude of the Rolling Load. E. C. Larke. *Sheet Metal Industries*, v. 32, no. 336, Apr. 1955, p. 299-304, 306.

Influence of roll diameter, resistance to deformation, influence of rate of deformation, temperature of rolling, and effect of

coiler and decoiler tension. Diagram, graphs, tables. 5 ref. (To be continued.)

9510* Investigations on Cold and Hot Rolling With Drag Roll and Determination of Roll Slippage by Means of the Forward Slip. **Untersuchungen über das Kalt- und Warmwalzen mit Schleppwalze und die Bestimmung des Walzenschlupfes aus der Voreilung.** (German.) Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen*, v. 75, no. 7, Apr. 7, 1955, p. 391-401.

Discussion of the development and application of the drag roll drive, test results, roll slippage and comparison of test results, and equation to compute slippage. Micrographs, table, diagram, graphs, photographs. 21 ref.

9511* The Use of the Magnetic Amplifier for the Quick Control of Rolling Mill Drives. **Der Einsatz des Magnetverstärkers für schnelle Regelungen von Walzwerksantrieben.** (German.) Joachim Wetzger. *Stahl und Eisen*, v. 75, no. 8, Apr. 21, 1955, p. 478-485.

Revolution and speed control of electric drives. Equipment and operating characteristics. Graphs, diagrams, photographs.

9512 Thread Rolling: Diversification Within a Method. *Steel*, v. 136, Apr. 25, 1955, p. 100-101.

With a change in tooling, the thread roller can form close-tolerance threads, and can roll worms, splines, and even gears. Photographs, diagrams.

9513 Which Frequency Do You Choose? *Steel*, v. 136, May 2, 1955, p. 126-128, 130.

Advantages of preheating by induction with low, high, or dual frequency. Photographs, diagram, tables.

9514 Extrusions Put Squeeze on Costs. Robert M. Love. *Steel*, v. 136, May 9, 1955, p. 78-81.

Substituting extruded pieces for rotor wedges, instead of machining, results in low cost, fast delivery, superior physical properties and shapes dimensionally close to the cross section of the finished product. Photographs, diagrams.

9515 Hot Extrusion At J & L—Solid Carbon Steel Sections Now in Production. *Steel Processing*, v. 41, Apr. 1955, p. 230-233, 256.

Plant will produce extrusions in solid sections which will range in weight from 1/3 lb. to 12 lb. per lineal ft., and up to 24 ft. in length. Photographs.

9516* **Precision Contour Rolling of Metals.** A. E. Felt. *Tooling and Production*, v. 21, Apr. 1955, p. 55-58.

Contour rolling is closely integrated with precision forging and forming, flash-welding, and fusion welding—to economically produce lighter and stronger structures. Diagrams, photographs.

9517* **Precision Radial Draw Forming.** Joseph Fredericks. *Tooling and Production*, v. 21, May 1955, p. 83-87.

Equipment and procedures for production of jet engine parts.

9518 The Fabrication of Arc-Melted Ingots of Titanium and Titanium-Manganese Alloys Into Plate. R. W. Huber, V. C. Petersen, and R. C. Wiley. *U. S. Bureau of Mines, Report of Investigations* 5117, Mar. 1955, 35 p. (TN21 Nn3r)

Various steps in fabricating the materials into finished plate; comparative mechanical tests; response of the Ti-Mn alloy to various heat treatments. Graphs, tables, micrographs. 8 ref.

9519* Stress Distribution in Metal During Forging of Shafts and Bars. **Issledovanie raspredeleniia napriazhenii v metalle pri kovke valov i shtang.** (Russian.) E. P. Unksov and V. M. Zavartseva. *Vestnik Mashinostroeniia*, v. 35, no. 3, Mar. 1955, p. 42-48.

Photoelastic studies. Technique of plotting diagrams. Photographs, diagrams, tables. 3 ref.

9520* Formation of Internal Flaws During Transversal Forging. **Obrazovanie vnutrennikh treshchin pri poperechnoi kovke.** (Russian.) V. S. Smirnov. *Vestnik Mashinostroeniia*, v. 35, no. 3, Mar. 1955, p. 49-53.

Causes and methods of prevention. Graphs, table, diagrams, photographs. 3 ref.

9521 Inert-Gas Metal-Arc Cutting. R. S. Babcock. *Welding Journal*, v. 34, Apr. 1955, p. 309-315.

Consumable electrode cutting process for straight-line, circular, and shape cuts on non-ferrous metals. Diagrams, graphs, photographs, micrographs, table.

9522 High-Speed Generator Forgings. C. M. Laffoon. *Westinghouse Engineer*, v. 15, May 1955, p. 94-98.

The development and introduction of new and specialized inspection techniques and forging art improvements have made possible the production of large, high quality rotor forgings for turbine generators. Photographs, diagram.

9523* **An Investigation of the Mechanics of Wire-Drawing.** J. G. Wistreich. *Wire Industry*, v. 22, Apr. 1955, p. 421 + 6 pages.

Relation between external forces, boundary conditions of the process, and plastic properties of the wire. Graphs, diagrams, tables, photograph.

9524* Problem of the Formation of Surface Defects on Al Sheets. **Beitrag zum Problem der Zipfelbildung bei Aluminiumblech.** (German.) Roland Funk. *Zeitschrift für Metallkunde*, v. 46, no. 3, Mar. 1955, p. 180-182.

Relation between non-homogeneity of the sheet surface and condition of rolling. Diagrams, photographs. 8 ref.

See also:

9295 (reclamation of Zr machining chips)
9390 (working of Haynes 25 alloy)
9552 (phosphorus segregation in steel forging)
9767 (plastics in tooling)

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

9525* **Electrolytic Etching.** Cornelius A. Johnson. *AB Metal Digest*, v. 1, Mar. 1955, p. 3-5, 9.

An indispensable tool in many routine studies of microstructures, as well as research type problems involving the development of specialized techniques. Graphs, photographs, diagrams, micrographs.

9526* **Data on Copper Oxyarsenate, Copper Nickeloxyarsenate, and Nickel Oxide Inclusions.** (English.) Z. Hegedüs. *Acta Technica Academiae Scientiarum Hungaricae*, v. 10, nos. 1-2, 1955, p. 117-126.

Optical and physical behavior; formation of nickel oxide inclusions, and their distinction from other non-metallic inclusions in Cu. Micrographs, table. 5 ref.

9527* Data on Copper Oxide Inclusions in Industrial Copper. **Angaben über die in technischen Kupfern vorkommenden Kupferoxydeinschlüsse.** (German.) Z. Hegedüs. *Acta Technica Academiae Scientiarum Hungaricae*, v. 10, nos. 1-2, 1955, p. 127-137.

Optical behavior and identifying characteristics; technological defects caused by the inclusion; reactions occurring during hot working. Micrographs. 3 ref.

9528* Transformation Behavior and Impact Toughness of Case-Hardened Steels. **Umwandlungsverhalten und Schlagzähigkeit von Einsatzstählen.** (German.) Helmut Krainer, Max Kroneis, and Reinhold Gattringer. *Archiv für das Eisenhüttenwesen*, v. 26, no. 3, Mar. 1955, p. 131-139; disc., p. 139-140.

TTT diagrams of steels with different C content in hard-surface layer; conditions for the intermediate annealing for complete transformation of surface zone, transformation zone, and core of unalloyed and alloyed steels; effect of hardness treatments on impact strength. Table, graphs, micrographs, diagram. 10 ref.

9529* Investigation of Transformation Processes and Segregation Phenomena in Nickel Steels With Magnetic Suspension. **Untersuchung von Umwandlungsvorgängen und Seigerungserscheinungen in Nickelstählen mit Magnetitsuspeion.** (German.) Kurt Hans v. Klitzing and Elfriede Wesselhöft. *Archiv für das Eisenhüttenwesen*, v. 26, no. 3, Mar. 1955, p. 141-144.

Metals—Metallography, Transformations, and Structures

Magnetic inhomogeneities in steels are revealed by orientation of magnetite particles in surface of metallographic specimens. Micrographs. 7 ref.

9530* Process of Etching Highly Alloyed Chromium and Chromium-Nickel Steels for Revealing Austenite, Ferrite, Sigmaphase, and Carbides. **Ätzverfahren für hochlegierte Chrom- und Chrom-Nickel-Stähle zum Nachweis von Austenit, Ferrit, Sigmaphase und Karbiden.** (German.) Franz Braumann and Günther Pier. *Archiv für das Eisenhüttenwesen*, v. 26, no. 3, Mar. 1955, p. 145-151.

Effect of several etchants on above phases; selective electrochemical etching of austenite-ferrite structure. Tables, micrographs, graphs, diagram. 10 ref.

9531* Experiences With Counting-Tube Equipment for X-Ray Micro-Structure Investigations and Spectrum-Emission Analysis. **Erfahrungen mit Zählrohrgeräten für Röntgen-Feinstrukturuntersuchungen und -Emissionsspektralanalyse.** (German.) Hermann Möller and Viktor Hauk. *Archiv für das Eisenhüttenwesen*, v. 26, no. 3, Mar. 1955, p. 171-178.

Comparison of Debye-Scherrer recordings on X-ray film with counting-tube goniometer recordings; accuracy of glancing-angle determination; limit of detecting admixtures; comparison with chemical analyses of steels and Fe-Cu mixtures. Tables, graphs, X-ray recordings, micrographs. 18 ref.

9532* **Grains Within Grains.** R. C. Gifkins. *Australasian Engineer*, 1955, Feb., p. 41-49.

History of the discovery of various types of subgrains is given, development of theories and their origin traced. X-ray pattern. diagrams, micrographs, photographs. 6 ref.

9533* **The Solution of Gases in Liquid and Solid Metals.** A. E. Jenkins. *Australasian Engineer*, 1955, Feb., p. 51-60.

Investigations concerning the solubility of gases in metals are summarized. Tables, graphs. 65 ref.

9534* Segregation of Foreign Atoms in the Melted Grain Boundaries of High-Purity Aluminum. **Ségrégation des atomes étrangers dans les joints fondus de l'aluminium de haute pureté.** (French.) Frédéric Montariol. *Comptes rendus*, v. 240, no. 10, Mar. 7, 1955, p. 1087-1089.

Effect of temperature on diffusion of impurities. Micrographs. 3 ref.

9535* Displaying by Autoradiography the Simultaneous Migration of Grain Boundaries and Dissolved Atoms in an Al-Cu Alloy With 0.4% Cu at Temperatures Close to the Melting Point of the Alloy. **Mise en évidence par autoradiographie de la migration simultanée des joints de grains et des atomes dissous dans un alliage Al-Cu à 0,4% Cu aux températures voisines du point de fusion de l'alliage.** (French.) Maurice Robert, André Robillard, and Paul Lacombe. *Comptes rendus*, v. 240, no. 10, Mar. 7, 1955, p. 1089-1091.

Studies on sheet specimens; diffusion-temperature relationships. Autoradiographs.

9536* Influence of Impurities on the Polygonization of Aluminum. **Influence des impuretés sur la polygonisation de l'aluminium.** (French.) Jean Montuelle and Georges Chaudron. *Comptes rendus*, v. 240, no. 11, Mar. 14, 1955, p. 1167-1168.

Study of the recrystallization of Al of different purities. Micrograph. 2 ref.

9537* Ordered Phase of a Copper Alloy Having 2% Beryllium. **Sur les phases ordonées de l'alliage de cuivre à 2% de béryllium.** (French.) Arunachala Viswanathan. *Comptes rendus*, v. 240, no. 13, Mar. 28, 1955, p. 1428-1430.

Copper alloy shows, by quenching from 750 C, the appearance of a tetragonal γ'-phase which is transformed into the γ-phase upon tempering. Diagram. 2 ref.

9538* Anodic Attack, Especially Suited to the Electron Micrography of 80-20 Nickel-Chromium-Type Alloys Susceptible to Hot Tough Structural Hardening. **Attaque anodique convenant spécialement à la micrographie électronique des alliages du type nickel-chrome 80-20, aptes au durcissement structural tenaces à chaud.** (French.) Yves Baillie and Pierre Gillies. *Comptes rendus*, v. 240, no. 13, Mar. 28, 1955, p. 1430-1432.

Metallographic preparation of Nimonic alloys is improved by using an anodic attack with hydrofluoric acid. Micrographs. 5 ref.

9539* Use of Isotope C^{14} for the Study of the Diffusion of Carbon in Steel. **Primenenie izotopa ugleroda C^{14} dlia izucheniia diffuzii ugleroda v stali.** (Russian.) P. L. Gruzin, V. G. Kostogonov, and P. A. Platonov. *Doklady Akademii Nauk SSSR*, v. 100, no. 6, Feb. 21, 1955, p. 1069-1072.

Test made in austenite and ferrite steels before and after tempering; temperature relation in γ- and α-iron. Graphs, tables. 9 ref.

9540* Problem of Diffusion of Arsenic in Steel. **K voprosu o diffuzii mysh'iaka v stali.** (Russian.) D. S. Kazarnovskii. *Doklady Akademii Nauk SSSR*, v. 100, no. 6, Feb. 21, 1955, p. 1073-1075 + 1 plate.

Micro-structure of steels with different arsenic content, after heat treatment; degree of striation. Micrographs, tables. 3 ref.

9541* Growth of Spheroidal Inclusions of Graphite in Cast Irons. **O srostkakh sharovidnykh vkliuchenii grafita v chugunakh.** (Russian.) K. P. Bunin, Iu. N. Taran, and T. M. Shpak. *Doklady Akademii Nauk SSSR*, v. 101, no. 1, Mar. 1, 1955, p. 65-67.

Nature of phenomena in gray magnesium cast iron, with solidification and tempering. Micrographs. 9 ref.

9542* Solubility of Oxygen in Liquid Iron Which Contains Titanium. **Rastvorimost' kisloroda v zhidkom zheleze, soderzhashchem titan.** (Russian.) B. K. Liaudis and A. M. Samarin. *Doklady Akademii Nauk SSSR*, v. 101, no. 2, Mar. 11, 1955, p. 325-326.

Two reaction formulas, on the basis of experimental data, are presented; one for Ti concentrations up to 0.04%, and the second for 0.04 to 0.5%. Table.

9543* Mechanism of Solidification and Segregations in Phosphorous Cast Irons. **Mécanisme de solidification et ségrégations dans les fontes phosphoreuses.** (French.) Michel Ferry, Gabrielle Aubrion, and Jean-Claude Margerie. *Fonderie*, 1955, no. 109, Feb., p. 4353-4372 + 1 plate.

Detailed study of dendritic segregation in above alloys. Graphs, tables, micrographs. 24 ref.

9544 The System Uranium-Tungsten. D. Summers-Smith. *Institute of Metals, Journal*, v. 83, Apr. 1955, p. 383-384.

Solubility of U in W and that of W in U were investigated in arc-melted alloys by X-rays, dilatometry, and metallography. Tables. 6 ref.

9545 Study of the Radiation Stability of Austenitic Type 347 Stainless Steel. M. B. Reynolds, J. R. Low, Jr., and L. O. Sullivan. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Apr. 1955, p. 555-559.

Effect of neutron bombardment on the stability of type 347 was investigated by a magnetic technique. Graphs, diagram, table. 3 ref.

9546 Some Observations on Isothermal Austenite Transformation Near the M_s Temperture. O. Schaaber. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Apr. 1955, p. 559-560.

Observations made on a number of low alloy steels by dilatometric and inductive measurement at various temperatures. Tables, graphs. 12 ref.

9547* Mechanism of Nodular Graphite Formation. **O mekhanizme obrazovaniia sharovidnogo grafita.** (Russian.) A. A. Gorshkov. *Liteinoe Proizvodstvo*, 1955, no. 3, Mar., p. 17-20.

Analysis of the chemical reactions of metals with a low melting point-Mg, Mg alloys, or Ce, and cast iron. Diagrams. 41 ref.

9548* Technique of Preparations for Metal Investigations. **Prepareertechniek bij het metaalonderzoek.** (Dutch.) W. G. R. de Jager and P. Breedveld. *Metalen*, v. 10, no. 5, Mar. 15, 1955, p. 61-65 + 6 plates.

Review of metallographic porcedures. Micrographs, table. 3 ref.

9549 Structure of the ω-Precipitate in Titanium-16 Per Cent Vanadium Alloy. J. M. Silcock, M. H. Davies, and H. K. Hardy. *Nature*, v. 175, Apr. 23, 1955, p. 731.

Relation between β- and ω-Ti as shown by study in Mo Kα radiation. X-ray diffractogram, diagram. 4 ref.

9550* Ordering Processes in Cu_3Au. Fred P. Burns and S. L. Quimby. *Physical Review*, v. 97, ser. 2, Mar. 15, 1955, p. 1567-1575.

Data are reported which describe the isothermal time rate of change of electrical resistivity in a specimen following a quench from a temperature above the critical temperature to one below it. Diagram, graphs. 21 ref.

9551* Structure Modifications of the Metallic Crystal and Their Influence on the Kinetics of the Structural Hardening of Solid Solutions of Aluminum. **Les modifications de structure du cristal métallique et leur influence sur la cinétique du durcissement structural des solutions solides d'aluminium.** (French.) Aurel Berghezan. *Publications scientifiques et techniques du ministère de l'air*, no. 283, 1953, 95 p. (TL507 F84.5p)

Influence of rate of quenching on hardening kinetics; relation between method of recrystallization prior to quenching and aging of solid solutions; effect of cold-hardening immediately after quenching. Diagrams, graphs, micrographs. 88 ref.

9552* A Radiographic Study of the Influence of Forging Upon the Dendritic Segregation of the P in Steel Ingots. **Etude autoradiographique de l'influence du forgeage sur la ségrégation dendritique du phosphore dans les lingots d'acier.** (French.) A. Kohn and J. Doumerc. *Revue de métallurgie*, v. 52, no. 3, Mar. 1955, p. 249-257.

Use of the autoadiographic method it was possible to determine the influence of forging and long time annealing upon segregation of P in the metal. Photographs, micrographs, diagram, graph. 3 ref.

9553* On the Order-Disorder Transformation of the Alloys of Iron and Cobalt. (English.) Hakaru Masumoto, Hideo Saitô, and Masao Shinozaki. *Science Reports of the Research Institutes, Tôhoku University*, ser. A, v. 6, no. 6, Dec. 1954, p. 523-528.

Data are presented on the measurement of the specific heat of the phase alloys of the Fe-Co system. Graphs, tables. 5 ref.

9554* On the Primary Crystallization of the System Sn-Bi. (English.) Tadashi Yanagihara and Rokurô Kawanishi. *Science Reports of the Research Institutes, Tôhoku University*, ser. A, v. 6, no. 6, Dec. 1954, p. 557-564.

Viscosity change during the solidification of the alloy Sn-Bi was studied with the rotational viscosimeter. Diagram, graphs, tables, micrographs. 3 ref.

9555* Dislocation Networks in Crystals. (English.) Taira Suzuki and Hideji Suzuki. *Science Reports of the Research Institutes, Tôhoku University*, ser. A, v. 6, no. 6, Dec. 1954, p. 573-596.

Space arrangements of networks have certain intimate connection with their persistence in crystals. Diagrams, graphs, table. 40 ref.

9556* Influence of the Degree of Deformation on the Diffusion Processes in Low Alloy Cu-Sn-P Alloy. **Einfluss des Verformungsgrades auf die Diffusionsvorgänge in einer niedrig legierten Kupfer - Zinn - Phosphor - Legierung.** (German.) Guido Bassi and Bengt Ström. *Zeitschrift für Metallkunde*, v. 46, no. 3, Mar. 1955, p. 208-209.

Investigation on Cu alloy with 0.3% Sn and 0.2% P under different heat treatments. Diagram, micrographs. 3 ref.

9557* Crystal Chemistry of B-Metals. **Zur Kristallchemie der B-Metalle. III.** Crystal Structure of GaSe and InTe. **Kristallstruktur von GaSe und InTe.** (German.) Konrad Schubert, Erhard Dörre, and Manfred Kluge. *Zeitschrift für Metallkunde*, v. 46, no. 3, Mar. 1955, p. 216-224.

Thorough investigation on the basis of bibliographical information and experimental data. Tables, diagram. 18 ref.

9558* Influence of Different Etching Agents on Germanium. **Einfluss verschiedener Ätzmittel auf Germanium. I.** Chemical Action of Certain Etching Agents on Germanium. **Chemische Wirkung einiger Agenzien auf Germanium. II.** Physical Consideration. **Physikalische Betrachtungen.** (German.) Oskar Rösner and Gotthold Zielasek. *Zeitschrift für Metallkunde*, v. 46, no. 3, Mar. 1955, p. 225-233.

The action of various liquids and gases is investigated, microscopically and gravimetrically, in addition to the recovery possibilities of germanium from spent etching solutions. Diagrams, tables, micrographs. 7 ref.

See also:

8756 (X-ray diffraction in metallurgy)
9229 (micro-structure of metals)
9449 (structure of gray cast iron)

METALS—POWDER

9559 Sintering of Powders and Related Processes. A. S. Berezhnoi. *Henry Brutcher Translation No.* 2889, 25 p. (From *Ogneupory*, v. 13, no. 6, 1948, p. 256-266.) Henry Brutcher, Altadena, Calif.

Classification of sintering processes; causes of growth of grains during sintering; types of distortions found in crystal lattice; and five successive stages of "dry" sintering. Graphs. 22 ref.

9560 Study of the Production of (Secondary) Cobalt and Tungsten-Carbide Powders. H. Rutkowski, B. Razumowski, and I. Glińska. *Henry Brutcher Translation No.* 3487, 13 p. (From *Prace Glownego Instytutu Metalurgii*, v. 4, no. 4, 1952, p. 153-160.) Henry Brutcher, Altadena, Calif.

Cemented carbides were prepared from Co powder obtained electrolytically, by reduction of Co formate, and from tungsten carbide recovered from scrap. Data on density and hardness. Tables, graphs, micrographs. 9 ref.

9561 SAP Retains Properties After High Temperature Exposure. Roland Irmann. *Iron Age*, v. 175, Apr. 28, 1955, p. 104-106.

Ability of sintered Al powder to retain high mechanical properties after continued exposure to high temperature suggests many interesting applications. Graphs, tables.

9562 New Trends in Powder Metallurgy. Herbert B. Michaelson. *Materials & Methods*, v. 41, Apr. 1955, p. 92-97.

Developments in the use of metal powders for rolled sheet, special structures, and flame spraying. Photographs, tables. 11 ref.

9563 Porous Metal Sheet. John B. Campbell. *Materials & Methods*, v. 41, Apr. 1955, p. 98-101.

Controlled permeability plus resistance to heat and corrosion make metal powder sheet materials useful for special applications. Photographs, diagrams, table, micrograph, graphs.

9564* Sintering of Brass. **La sinterizzazione dell'ottone.** (Italian.) Neri Corsini. *Metallurgia italiana*, v. 47, no. 2, Feb. 1955; *Atti notizie (AIM)*, v. 10, no. 2, Feb. 1955, p. 49-52; disc., p. 52.

Discussion of technical characteristics of sintered brass powders; economic aspects. Table, graphs, micrographs. 8 ref.

9565* Crystal Structure Investigation and Microhardness Determination of High W Sintered Alloys of the W-Cr-Ni System. **Gefügebeobachtungen und Mikrohärtemessungen an hochwolframhaltigen Sinterlegierungen des Systems Wolfram-Chrom-Nickel.** (German.) H. Bückle. *Planseeberichte für Pulvermetallurgie*, v. 3, no. 1, Feb. 1955, p. 2-16.

Influence of different compositions and sintering temperature on the structure and physical properties. Phase diagrams, micrographs, graphs. 10 ref.

9566* Sintered Frictional Materials. **Spiekane materiały cierne.** (Czech.) W. Cegielski. *Prace Instytutów Ministerstwa Hutnictwa*, v. 7, no. 1, 1955, p. 17-23.

Survey of powdered frictional materials, technology of their production, application and various types of design solutions. Tables, diagrams, micrographs, photograph. 7 ref.

Metals—Powder

9567 Rolling 18-8 Stainless Steel Powder Into Strip. Samuel Storchheim, John Nylin, and Bernard Sprissler. *Sylvania Technologist*, v. 8, Apr. 1955, p. 42-44.

Results of investigation indicate the possibility of producing strips possessing high density, high tensile strength, good ductility and corrosion resistance, and relatively random crystallographic orientation. Tables, graphs. 7 ref.

9568* Influence of Alloy Conditions on the Physical Properties and Recrystallization of Vacuum Sintered Mo. **Einfluss von Legierungszusäten auf Festigkeitseigenschaften und Rekristallisation von vakuum-gesintertem Molybdän.** (German.) Egon Pipitz and Richard Kieffer. *Zeitschrift für Metallkunde*, v. 46, no. 3, Mar. 1955, p. 187-194.

Investigation of the influence of Be, Ti, Zr, V, Th, Cb, Ta, Cr, W, and Mn on the recrystallization process and physical properties. Tables, graphs, photographs. 15 ref.

See also:

8979 (aluminum powder)

MINING ENGINEERING

9569* Rapid Method for Determining Magnesium-Calcium Ratios of Well Samples and Its Use in Predicting Structure and Secondary Porosity in Calcareous Formations. Richard Louis Jodry. *American Association of Petroleum Geologists, Bulletin*, v. 39, Apr. 1955, p. 493-511.

Includes diagrams, tables, photograph, maps. 9 ref.

9570* The Introduction of Tungsten Carbide Tipped Rock Drill Steel and Its Effects on Production on Vogelstruisbult Gold Mining Areas Limited. W. L. Cousens and E. Veres. *Chemical, Metallurgical & Mining Society of South Africa, Journal*, v. 55, Feb. 1955, p. 179-191.

Includes tables, graph, diagrams.

9571* Rotary Drilling. Some Possibilities and Limitations in Hard Rocks. C. Fairhurst. *Colliery Guardian*, v. 190, Apr. 21, 1955, p. 477-481.

Variables investigated were rake angle, no. of free faces, depth of cut, speed of cutting, obliquity, homogeneity of rock, and effect of wear. Photographs, graphs.

9572* Battelle Mud Study. VI. Chip Clearance Depends on Fluid Properties, Design of Bit Hydraulics. Donald Gideon and Ralph Simon. *Drilling Contractor*, v. 11, Apr. 1955, p. 63-64.

In general, chips are cleared from bottom faster when turbulence of the flushing fluid is greater where the chips are formed. Clearance of chips will be facilitated by increasing the velocity of the fluid emitting from the bit, reducing the kinematic viscosity and gel strength of the fluid to as low a value as is consistent with other requirements, and designing the hydraulics of the bit so that the fluid streams are directed where the chips are formed. Graph.

9573 Preparation of Water for Injection Into Oil Reservoirs. Paul Dwight Torrey. *Journal of Petroleum Technology*, v. 7, Apr. 1955, p. 9-16.

Importance of quality and source of supply. Graphs, diagram. 9 ref.

9574 Development and Application of "Frac" Treatments in the Permian Basin. R. E. Hurst, J. M. Moore, and D. E. Ramsey. *Journal of Petroleum Technology*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 204, Apr. 1955, p. 58-65.

Improvements made in treating materials, procedures, and equipment. Photographs, table, micrographs. graph. 4 ref.

9575* Complex Characteristics of the Process of Rotary Drilling. **Kompleksnye kharakteristiki protsessa turbinnogo bureniia.** (Russian.) G. I. Bulakh. *Neftianoe Khoziaistvo*, v. 33, no. 3, Mar. 1955, p. 14-20.

Includes diagrams.

9576 An Improved Emulsion-Oil System. H. M. Barrett. *Oil and Gas Journal*, v. 53, Apr. 25, 1955, p. 113-114.

Tannin enables better control of viscosities and gel strengths of the mud. Tables. 4 ref.

9577 Effect of Oil Viscosity on the Recovery of Oil by Water Flooding. A. N. Fried. *U. S. Bureau of Mines, Report of Investigations* 5115, Mar. 1955, 34 p. (TN21 Un3r)

Results of a series of 11 laboratory water-flooding experiments in which oils of seven different viscosities, ranging from approximately 1½ to 850 centipoises, were displaced from an alundum core by brine. Graphs, tables, diagrams, photograph. 28 ref.

9578 Factors Affecting the Maintenance of Rotary Drilling Fluids. I. Earl E. Huebotter, T. H. Dunn, and Frank S. Bell. *World Oil*, v. 140, May 1955, p. 126 + 5 pages.

Determination and evaluation of the principal operations that affect the maintenance of rotary drilling fluids and their bearing upon treatments and costs. Graphs, diagrams. 4 ref.

9579 Using Sea Water for Drilling Mud. T. B. O'Brien. *World Oil*, v. 140, May 1955, p. 134 + 4 pages.

Problems, treatment, and field results of sea water muds. Tables. 1 ref.

See also:

8995 (cathodic protection of well casing)

NONDESTRUCTIVE TESTING

9580 Uses of Ultrasound in Technology and Physics. S. Ya. Sokolov. *Henry Brutcher Translation No.* 3029, 14 p. (From *Zavodskaya Laboratoriya*, v. 14, no. 11, 1949, p. 1328–1335.)

Technical applications of ultrasonic waves development and use of an ultrasonic microscope. Graphs, diagram, circuit diagrams, micrographs, photograph. 8 ref.

9581 Isotopes and Metals Engineering. I. G. G. M. Carr-Harris. *Canadian Metals*, v. 18, Apr. 1955, p. 26-28, 30, 32.

Review describing the uses of radioisotopes in the design and production of metal products. Photographs. (To be continued.)

9582* New Techniques in Electronic Nondestructive Materials Testing. **Neue Verfahren der elektronischen zerstörungsfreien Werkstoffprüfung.** (German.) F. Förster. *Elektro-Post*, v. 8, nos. 8-9, Mar. 29, 1955, p. 230-234.

Description of new electronic testing equipment. Graphs, diagrams, photographs. 32 ref.

9583* Nondestructive Testing With the Aid of Electric Induction Processes. **Zerstörungsfreie Werkstoff-prüfung mit Hilfe elektro-induktiver Verfahren.** (German.) W. Schirp. *Elektro-Post*, v. 8, nos. 8-9, Mar. 29, 1955, p. 234-237.

Principle of and equipment for detecting defects and sorting metals. Diagrams, photographs, micrographs, table. 11 ref.

9584* Nondestructive Testing of Insulators by Means of Betatron X-Rays. **Die zerstörungsfreie Prüfung von Isolatoren mit Betatron-Röntgenstrahlen.** (German.) Herbert Baatz and Gerhard Reverey. *Elektrotechnische Zeitschrift*, v. 76, Ausgabe A, no. 5, Mar. 1955, p. 195-197.

Theoretical bases, method, and technique of application. Photographs. 3 ref.

9585* Surface Examination by Reflection Electron Microscopy. J. S. Halliday. *Engineer*, v. 199, Apr. 22, 1955, p. 569-573.

Advantages of reflection electron microscopy over other methods of surface examination are discussed. Micrographs, diagrams, table.

9586* Gammagraphic Examination of Light-Alloy Cast Pieces by Means of the Radio-Isotope, Thulium 170. **L'examen gammagraphique des pièces moulées en alliages légers au moyen du radio-isotope thulium 170.** (French.) Albert Blondel and Pierre Broquet. *Fonderie*, 1955, no. 110, Mar., p. 4427-4433.

Methods of use; quality study of radiographic images; examination of a Cu-Al alloy. Diagrams, gammagraphs. 13 ref.

9587 Magnetic Particle Technique Makes Billet Inspection Positive and Efficient. O. G. Smith. *Iron Age*, v. 175, May 5, 1955, p. 99-101.

Benefits of billet inspection, using magnetized particles and ultra-violet light to detect flaws. Photographs.

9588 Metallurgical Inspection of Jet-Engine Parts. *Machinery*, v. 61, May 1955, p. 154-158.

Inspection practices to assure the structural soundness of precision parts for jet engines and electronic guidance systems. Photographs.

8589* Industrial Control by Ultrasonics. **Contrôle industriel par les ultra-sons.** (French.) Jean Daurat. *Métallurgie et la construction mécanique*, v. 87, no. 3, Mar. 1955, p. 191-193, 195.

Describes reflectogage, an apparatus for ultrasonic control of materials by resonance; application to brazed joints. Diagram, reflectograms. (To be continued.)

9590* **Practical Methods of Steel Identification.** Howard E. Boyer. *Modern Machine Shop*, v. 27, May 1955, p. 140 + 9 pages.

Applicable where highly diversified manufacturing operations are performed and where problems revolving around mixed steels tend to become sizable. Diagram, photograph. (To be continued.)

9591* Signaling, Counting or Registration of the Defects of the Metallurgical Products, by Means of Ultrasonic Sounding With Echo. **Signalisation, comptage ou enregistrement des défauts des produits métallurgiques au moyen du sondage ultrasonore automatique par échos.** (French.) L. Beaujard, V. Husarek, and A. Vasset. *Revue de métallurgie*, v. 52, no. 3, Mar. 1955, p. 240-248.

Gives possibilities of mapping or counting the defects in a given piece. Oscillograms, photographs, diagrams, micrographs. 4 ref.

9592* The Magnetic Powder "Aero" for Electromagnetic Determination of Steel Surface Defects. **Magnetický prášek "Aero" pro elektromagnetické zjišťování povrchových vad v oceli.** (Czech.) Julius Šubert and Jaroslav Jareš. *Slévárenství*, v. 3, no. 3, Mar. 1955, p. 75-77.

Possibilities of the steel surface defectoscopy method by means of detection fluid and magnetic power. Photographs.

9593 Short Cut in Billet Conditioning. *Steel*, v. 136, May 2, 1955, p. 114, 117.

Method of speeding up inspection of semi-finished steel for the tube mill. Photographs.

9594 Ultrasonic Inspection of Arc-Cast Zirconium and Its Alloys. F. W. Wood and J. O. Borg. *U. S. Bureau of Mines, Report of Investigations* 5126, Mar. 1955, 8 p. (TN21 Un3r)

Method described may be used to delineate irregularities, inclusions, porosity, or shrink holes in ingots up to 48 in. in length. Diagrams, photographs.

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

9595* Half-Life and Radiations of the Long-Lived Isotope of Niobium (^{94}Nb). (English.) Mario A. Rollier, Einar Saeland, Armando Morpurgo, and Albertina Caglieris. *Acta Chemica Scandinavica*, v. 9, no. 1, 1955, p. 57-67.

Neutron irradiated Nb metal, separated from Ta by di-*iso*-propyl ketone extraction, shows a half-life of 1.77 x 10^4 yr. Graphs, chromatogram. 15 ref.

9596 Radioactive-Isotopes. *Aircraft Production*, v. 17, May 1955, p. 170-175.

Industrial applications of low-power nuclear energy sources. Photographs, diagrams, tables, graphs.

9597* Determination of Radioactive Strontium and Barium in Water. Richard B. Hahn and Conrad P. Straub. *American Water Works Association, Journal*, v. 47, Apr. 1955, p. 335-340.

Expanded use of radioactive materials and their discharge into streams may result in concentrations of radioactive materials exceeding the recommended limits. Tables. 5 ref.

9598* Radiation Chemistry of Water—A Guide of Radiation Biology. **Strahlenchemie des Wassers, ein Wegweiser der Strahlenbiologie.** (German.) M. Ebert. *Angewandte Chemie*, v. 67, no. 6, Mar. 21, 1955, p. 169-173.

Formation of different products of ionization or states of excitation in water. Tables, graph. 28 ref.

9599* Ionization and Energy Losses of Alpha-Particles in Different Gases. **Ionisation und Energieverlust von Alpha-Teilchen in verschiedenen Gasen.** (German.) W. Riezler and A. Rudloff. *Annalen der Physik*, v. 15, nos. 3-4, 1955, p. 224-245.

Includes tables, graphs, diagram. 24 ref.

9600* Microchemical Preparation of Radioberyllium 7. **Préparation micro-chimique du radiobéryllium 7.** (French.) Robert Mellet, Pascaline Daudel, and Roland Muxart. *Bulletin de la société chimique de France*, 1955, no. 4, Apr., p. 460-563.

A comparative study of period of decay in the solid metal and vapor states. Table, diagram. 7 ref.

9601 Nuclear Radiations, Their Effects Upon Organic Materials. Samuel S. Jones. *Canadian Chemical Processing*, v. 39, Apr. 1955, p. 36 + 10 pages.

Physical and chemical effects are separately covered. Photographs. 20 ref.

9602 Atomic Power. *Canadian Chemical Processing*, v. 39, Apr. 1955, p. 60 + 4 pages.

Fuel reserves, power plants, and costs. Diagram, photograph.

9603 Radioactive Isotopes for Process Control. D. C. Brunton. *Canadian Chemical Processing*, v. 39, Apr. 1955, p. 83-84, 86, 88.

Simplicity, high accuracy, and ease of maintenance are stressed. Table, photographs.

9604 High Temperatures—Hurdle in Race to Atomic Power. Willard F. Libby. *Chemical and Engineering News*, v. 33, May 9, 1955, p. 1944-1945.

Stresses lack of high temperature research which may prove vital to future atomic development. Table.

9605* Excitation by Coulomb Interaction of Thallium. **Excitation par interaction coulombienne du thallium.** (French.) Roland Barloutaud, Tovy Grjebine, and Michel Riou. *Comptes rendus*, v. 240, no. 11, Mar. 14, 1955, p. 1207-1210.

Excitation by protons of $Tl_{203, 205}$ to observe γ-rays of 205, 280, and 410 k.e.v. Graphs. 11 ref.

9606* Rapid Coincidence and γ-γ Spectroscopy With an INa(Tl) Scintillation Counter; Application to Rh^{102}(I). **Coïncidence rapide et spectroscopie γ-γ avec compteur à scintillations INa(TL), application au ^{102}Rh(I).** (French.) Louis Dick, Roger Foucher, Nils Perrin, and Hamlet Vartapetian. *Comptes rendus*, v. 240, no. 12, Mar. 21, 1955, p. 1335-1337.

Results of study. Graphs. 8 ref.

9607* Nuclear Potential in a Liquid-Drop Model. **Potentiel nucléaire dans un modèle de goutte liquide.** (French.) Daniel Curie. *Comptes rendus*, v. 240, no. 13, Mar. 28, 1955, p. 1417-1419.

Expression of the potential acting on a nucleon in a nucleus, using a liquid drop as a model. Graph. 3 ref.

9608* Magnetic Properties of the Exciton. **Magnitnye svoistva eksitona.** (Russian.) A. G. Samoilovich and M. V. Kononova. *Doklady Akademii Nauk SSSR*, v. 101, no. 1, Mar. 1, 1955, p. 55-57.

Mathematical treatment. 4 ref.

9609* Life of Isomeric Nuclei. **K voprosu o vremeni zhizni izomernykh iader.** (Russian.) E. P. Mazets and L. I. Rusinov. *Doklady Akademii Nauk SSSR*, v. 101, no. 2, Mar. 11, 1955, p. 253-256.

Gamma radiation; spin; effect of numbers of neutrons and protons. Graphs. 6 ref.

Nuclear Physics, Nucleonics, and Radiation

9610* Elastic Scattering of Neutrons by C in the Energy Range 1.92 M.E.V. to 3.84 M.E.V. **Elastische Streuung von Neutronen an Kohlenstoff im Energiegebiet 1,92 MeV bis 3,84 MeV.** (German.) R. Budde and P. Huber. *Helvetica Physica Acta*, v. 28, no. 1, 1955, p. 49-66.
Includes table, graphs. 35 ref.

9611 Measurement of the Elastic Constants of Single Crystal Cobalt. H. J. McSkimin. *Journal of Applied Physics*, v. 26, Apr. 1955, p. 406-409.
Elastic constants of hexagonal Co have been determined using pulse modulated ultrasonic waves. Diagrams, tables, graph. 10 ref.

9612* Determination of Total Carbon and Its Radioactivity. II. Reduction of Required Voltage and Other Modifications. F. Marott Sinex, John Plazin, D. Clareus, W. Bernstein, Donald D. Van Slyke, and R. Chase. *Journal of Biological Chemistry*, v. 213, Apr. 1955, p. 673-680.
Includes circuit diagrams, graphs. 7 ref.

9613* (γ,α), $(\gamma,n\alpha)$, and (γ,t) Reactions on Br^{81}, Ag^{109}, K^{39}, and O^{16} Isotopes. **Réactions (γ,α), $(\gamma n\alpha)$ et (γ,t) sur les isotopes ^{81}Br, ^{109}Ag, ^{39}K et ^{16}O.** (French.) J. Schmouker, P. Erdös, P. Jordan, and P. Stoll. *Journal de physique et le radium*, v. 16, no. 3, Mar. 1955, p. 169-175.
Includes graphs. 18 ref.

9614* Photomultiplier Study of Scintillations Produced in a Zinc Sulfide Screen by α-Particles. **Étude, au photomultiplicateur, des scintillations produites dans un écran de sulfure de zinc par des particules α.** (French.) J. P. Anthony. *Journal de physique et le radium*, v. 16, no. 3, Mar. 1955, p. 182-190.
Includes diagrams, graphs, tables, circuit diagrams. 11 ref.

9615* On the Problems of Probability Calculations Occurring During Nuclear Fission Investigations. **Maghasadási vizsgálatoknál fellépő valószínűségszámítási kérdésekről.** (Hungarian.) Lénárd Pál. *Magyar Fizikai Folyóirat*, v. 3, no. 1, 1955, p. 31-42.
Theoretical suggestions for consideration of the disturbance caused by α-radiation in ionization chambers. Graphs, tables. 3 ref.

9616 Experiments on Oriented ^{60}Co Nuclei. (English.) O. J. Poppema, M. J. Steenland, J. A. Beun, and C. J. Gorter. *Physica*, v. 21, no. 3, Mar. 1955, p. 233-250.
Essential parts of the experimental set-up are described. Diagrams, graphs, table. 22 ref.

9617* Disordering of Solids by Neutron Radiation. W. S. Snyder and Jacob Neufeld. *Physical Review*, v. 97, ser. 2, Mar. 15, 1955, p. 1636-1646.
General method for determining the no. of vacant lattice sites or interstitial atoms in a monatomic solid exposed to neutron radiation. Table, graphs. 15 ref.

9618 Radioactivity of Co^{57}. Bernd Crasemann and D. L. Manley. *Physical Review*, v. 98, ser. 2, Apr. 1, 1955, p. 66-68.
Includes graphs. 19 ref.

9619 Production of Heavy Unstable Particles by 1.37-Bev Pions. W. B. Fowler, R. P. Shutt, A. M. Thorndike, and W. L. Whittemore. *Physical Review*, v. 98, ser. 2, Apr. 1, 1955, p. 121-130.
Indications that a hyperon and *K*-meson are normally produced together. Tables, photographs. 21 ref.

9620 Partition Function for a System of Interacting Bose-Einstein Particles. S. T. Butler and M. H. Friedman. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 287-293.
Definitions and evaluation of the partition function; application to He^4. Graphs. 16 ref.

9621 Bose-Einstein Condensation of an Imperfect Gas. M. H. Friedman and S. T. Butler. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 294-299.
Reduction and evaluation of the partition function; comparison with liquid He and the ideal gas; thermodynamic properties above and below the transition point are examined. Graph. 4 ref.

9622 New Method for Measuring the α-Particle Range and Straggling in Liquids. Gunnar Aniansson. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 300-302.
Includes diagram, graph, table. 16 ref.

9623 Mechanism of the Termination of the Geiger Plateau Region. H. L. Wiser and A. D. Krumbein. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 303-310.
Analysis of data indicates that spurious count could result from secondary electrons created by positive-ion bombardment of the cathode, and metastable atom and mol. decay in the gas. Tables, graphs, diagrams. 13 ref.

9624 Ambipolar Diffusion in a Magnetic Field. Albert Simon. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 317-318.
Diffusion of ions in a plasma across the magnetic field is not ambipolar in character. Graph. 4 ref.

9625 Mobility of Slow Electrons in Polar Crystals. Francis E. Low and David Pines. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 414-418.
Calculation of polaron mobility. Graph. 10 ref.

9626 Effects Produced by the Ionic Bombardment of Germanium. W. D. Cussins. *Physical Society, Proceedings*, v. 68, no. 424B, Apr. 1955, p. 213-222.
Includes diagram, graphs. 9 ref.

9627* Nuclear-Energy Study Course. X. Radiation Shielding and Power Cycles. Henry C. Schwenk and Robert H. Shannon. *Power*, v. 99, May 1955, p. 94-96, 198.
Discusses the factors that must be considered in choosing shielding materials. Photograph, diagrams, graphs.

9628* Atomic Energy for Peaceful Purposes. **Atomnaia energiia dlia mirnykh tselei.** (Russian.) M. B. Neiman. *Priroda*, v. 44, no. 4, Apr. 1955, p. 9-23.
Nuclear reactor types and the regulation of their output; atomic electric power stations. Tables, graphs, photographs, drawings. 12 ref.

9629* Radiation Units and Dosimetry. *Radiation Applications*, 1955, Apr., 4 p.
Discusses the underlying principles of radiological measurements. Diagram, table. 5 ref.

9630 ZnS(Ag) Phosphor Mixtures for Neutron Scintillation Counting. P. G. Koontz, G. R. Keepin, and J. E. Ashley. *Review of Scientific Instruments*, v. 26, Apr. 1955, p. 352-356.
Measurement of light-decay constant of ZnS; survey of ZnS(Ag) neutron detecting mixtures. Graphs, tables. 16 ref.

9631 X-Ray Diffractometry of Radioactive Samples. T. R. Kohler and William Parrish. *Review of Scientific Instruments*, v. 26, Apr. 1955, p. 374-379.
Technique, using a scintillation counter, permits measurement of X-ray patterns from strongly radioactive specimens. Tables, graphs. 10 ref.

9632* Isotopic Spin of Light Nuclei. **Izotopicheskii spin lëgkikh yader.** (Russian.) A. Baz' and Ia. Smorodinskii. *Uspekhi Fizicheskikh Nauk*, v. 55, no. 2, Feb. 1955, p. 215-264.
Discusses isotopic spin of nucleons, quantum characteristics of nuclear levels; law of conservation of isotopic spin, β-decay, etc. Graphs, tables. 26 ref.

9633* Properties of the Light Isotope of He^3 at Low Temperatures. **Svoistva lëgkogo izotopa geliia He^3 pri nizkikh temperaturakh. II.** (Russian.) R. A. Chentsov. *Uspekhi Fizicheskikh Nauk*, v. 55, no. 2, Feb. 1955, p. 265-287.
Theories of liquid He^3 and liquid mixtures of He^3 and He^4. Graphs. 193 ref.

9634 The Nuclear Propulsion Plant of the USS Nautilus. II. L. H. Roddis, Jr. and J. W. Simpson. *Westinghouse Engineer*, v. 15, May 1955, p. 89-93.
Includes diagrams, photographs.

9635* Test of a Strongly Idealized Theory of Hyperons. **Versuch einer stark idealisierten Theorie der Hyperonen.**

(German.) G. Herber. *Zeitschrift für Naturforschung*, v. 10a, no. 2, Feb. 1955, p. 103-109.

Theoretical explanation of the term "Hyperon" as a nucleon in a state of excitation. 12 ref.

Books and Miscellaneous Publications

9636* An Atlas of Typical Expansion Chamber Photographs. (English, German, and French.) W. Gentner, H. Maier-Leibnitz, and W. Bothe. 199 p. 1954. Pergamon Press, London. (QC787.P5 G28a)

Examples of cloud-chamber tracks made by various nuclear particles.

See also:

8599 (radiation effects on insects)
8616 (radiation effects on bacteria)
8620 (radiation effects on enzymes)
8621 (bacteriophage as an indicator)
8727 (radium analysis)
8865 (radioactive anthracene and acridine)
9169 (use of isotopes in geogly)
9179 (nuclear emulsions)
9200 (nuclear energy for rock)
9239 (isodose recorder)
9581 (radioisotopes for inspection of metals)

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

9637 New Methods for Computing Parameters of Complete or Truncated Distributions. (English.) Waloddi Weibull. *Aeronautical Research Institute of Sweden, Report* 58, 1955, 21 p. (TL504 F67m)

Methods applicable to truncated or censored distributions which may be required when dealing with distributions composed of more than one component or with fatigue tests stopped at some predetermined time before all the specimens have failed. Tables, graphs. 3 ref.

9638 Executive Vulnerability Threatens Management Continuity. William M. Stocker, Jr. *American Machinist*, v. 99, Apr. 25, 1955, p. 113-115.

Complex problems that must be solved before disaster strikes to insure that business, social, and legal requirements are fulfilled during emergency operation.

9639* Battelle Memorial Institute for Germany. **Battelle Memorial-Institut für Deutschland e.V.** (German.) *Bitumen, Teere, Asphalte, Peche*, v. 6, no. 2, Feb. 1955, p. 67.

Description; organization; future prospects.

9640 New Management Dimension. *Chemical and Engineering News*, v. 33, May 2, 1955, p. 1906-1908.

Role of chemical industry in packaging. Photograph.

9641 Photoelectric Reader Feeds Business Machines. David H. Shepard and Clyde C. Heasly, Jr. *Electronics*, v. 28, May 1955, p. 134-138.

Ordinary printed characters are scanned vertically at rate of 3,600 words per min., and resulting signals from phototube are fed into a character-recognizing memory for transfer to punched cards, perforated tape, of magnetic taps as required for feeding the inputs of electronic business machines. Diagrams, photographs. 2 ref.

9642 New Welding Techniques Require Reinvestigation of Possible New or Different Halth Hazards. H. H. Schrenk. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 103A-105A.

3 ref.

9643 Use of Statistics as Imporant Research Tool. Sidney Neuwirth. *Industrial Laboratories*, v. 6, May 1955, p. 6-9.

Growing recognition among chemists, engineers, and kindred research scientists that the principles of statistics should be an integral ingredient in the research effort. Photograph, graphs.

Books and Miscellaneous Publications

9644 The Foundations of Statistics. Leonard J. Savage. 294 p. 1954. John Wiley & Sons, New York. (HA29 Sa92f)

Discussion of the role of foundations and their historical background. An examination of current statistical theory and practice.

9645 EUSEC Conference on Engineering Education, Proceedings. 171 p. 1953. Institute of Civil Engineers, London. (T65 C76e)

Various aspects of criteria of entry, curriculum, and qualifications of engineering education in Europe and the U. S.

See also:

8669 (engineering precautions)
9148 (industrial fire hazards)
9479 (safety equipment in rolling mills)
9603 (radioisotopes in process control)
9782 (rubber in mechanical handling equipment)

ORE AND MATERIALS BENEFICIATION

9646 Sintering Practice at Ford Motor Company. Robert L. Cleveland. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 9 p. (TN716 Am35p)

Equipment and operating procedures. Photographs, flowsheet, tables.

9647 The Making of Self-Fluxing Sinter and Its Use in the Blast Furnace. Christer Danielsson. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 16 p. (TN716 Am35p)

Review of sinter production. Effect of ore preparation on blast furnace performance. Graphs, tables, photographs. 20 ref.

9648 Grading Minnesota Iron Ores for the Blast Furnace. Myron W. Griswold. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 6 p. (TN716 Am35p)

Sampling and analysis of iron ore cargoes. Tables, diagrams.

9649 Production and Properties of Experimental Pellet-Sinter. F. M. Hamilton and H. F. Ameen. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 8 p. (TN716 Am35p)

Results of laboratory studies of a hybrid agglomerate, termed "pellet-sinter", which was prepared by a procedure utilizing a combination of the pelletizing and sintering processes. Tables, photographs, graphs, micrographs.

9650 Permeability of Sinter-Plant Feed. M. O. Holowaty and John F. Elliott. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 13 p. (TN716 Am35p)

Study of the factors that influence the permeability of the raw sinter feed. Tables, photographs, diagram, graphs. 5 ref.

9651 Study of the Productivity of Conventional Dwight-Lloyd Sintering Machine. M. O. Holowaty, H. A. Goldfein, and C. B. Sheets. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 34 p. (TN716 Am35p)

Factors affecting rate of production of sinter. Graphs, photographs, tables, diagrams, chart. 22 ref.

9652 Production and Use of Iron Coke. Charles C. Russell, P. Whitstone, and R. P. Liggett. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint*, 1955, 27 p. (TN716 Am35p)

Upgrading of fine sizes of iron ore and blast furnace flue dust by blending the fine material with coal and coking the mixture in coke ovens. Tables, graphs, micrograph, photographs. 17 ref.

9653* Wet Processing of Oxidized Copper Ore by the "Compañia Minera Sali Hochschild" in Copiapó, Chile. **Die nassmetallurgische Verarbeitung oxydischer Kupfererze durch die**

Ore and Materials Beneficiation

"Compañía Minera Sali Hochschild" in Copiapó, Chile. (German.) Walter Wendt. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 100, no. 2, Feb. 1955, p. 109-112.

Method; optimum conditions; per cent of recovery. Flowsheet, diagram.

9654* Effect of Fine Particle Sizes on Sulfide Flotation. Arthur P. Wichmann and Roshan Boman Bhappu. *Colorado School of Mines, Quarterly*, v. 50, Apr. 1955, 37 p.

Effect of fine particle sizes of quartz, kaolin, and galena are identical in many respects. Finer sizes of these minerals causes gradual falling off in grade and recovery of the sulfide. Tables, graphs. 14 ref.

9655 Flotation Frothers for Low-Rank Coals. J. Mainhood and P. F. Whelan. *Journal of Applied Chemistry*, v. 5, Mar. 1955, p. 133-144.

Monohydric alcohols and monocarboxyclic acids of C_8 size were best of reagents tested. Tables, graphs, photographs. 17 ref.

9656 Reserve's E. W. Davis Works Installs New Heat Hardening Process for Taconites. *Journal of Metals*, v. 7, Apr. 1955 p. 538-539.

Heat hardening of taconite pellets promises easy quality control, minimum breakage, and operating simplicity. Photographs, flowsheet, table.

9657* Ore Pelletizing Process. **Proces grudkowania rud.** (Czech.) B. Seweryński and T. Wlazińska. *Prace Instytutów Ministerstwa Hutnictwa*, v. 7, no. 1, 1955, p. 24-29.

Survey of foreign literature concerning the theory of pellet formation. Graphs. 5 ref.

9658* Hardening Process of Iron Ore Pellets. **Proces utwardzania grudek.** (Czech.) B. Seweryński and T. Wlazińska. *Prace Instytutów Ministerstwa Hutnictwa*, v. 7, no. 1, 1955, p. 30-34.

Factors and conditions essential for hardening of pellets. Graphs, micrographs. 6 ref.

9659* Treatment of Grains by Dense Liquids in French Washeries. **Traitement des grains par liquide dense dans les lavoirs français.** (French.) L. Pozzetto. *Revue de l'Industrie Minérale*, v. 36, no. 617, Jan. 1955, p. 166-183.

Use of dense liquids for cleaning coal. Tables, graphs.

9660* The "Blofif" Process for the Washing of Fines by Dense Liquid. **Le procédé "Blofif pour le lavage des fines par liquide dense.** (French.) R. Blondelle. *Revue de l'Industrie Minérale*, v. 36, no. 617, Jan. 1955, p. 192-205.

In above process a suspension of water and finely ground magnetite is used to carry out densimetric cleaning of fine coal. Diagrams, tables, graph.

9661* Coal Flotation at the Bassin du Nord and Pas-de-Calais Coal Mines. **La flottation du charbon aux houillères du Bassin du Nord et du Pas-de-Calais.** (French.) L. Beauxis and R. Veillet. *Revue de l'Industrie Minérale*, v. 36, no. 620, Mar. 1955, p. 363-374.

Thermal drying of flotation concentrates. Economic factors. Diagrams, graphs, tables.

9662* Treatment of Washery Water by Low-Pressure Cyclone. **Traitement des eaux de lavage par cyclone à basse pression.** (French.) P. Belugou and Aït Ouyahia. *Revue de l'Industrie Minérale*, v. 36, no. 620, Mar. 1955, p. 391-404.

Presents various possibilities of using low-pressure cyclone thickeners and clarifiers in coal washing plants. Graphs, diagrams.

9663* Study of the desulphurization, by agglomeration over a grille, of a barytic iron ore. **Étude de la désulfuration par agglomération sur grille d'un minerai de fer barytique.** (French.) J. Astier. *Revue de métallurgie*, v. 52, no. 1, Jan. 1955, p. 47-62; disc., p. 62.

Results of tests to deterimne optimum conditions for desulphurization of Khenifra iron ore. Tables, diagrams, graphs. 22 ref.

9664* J & L Pilot Plant Successful. Development Adds to Ore Supply. *Steel Equipment & Maintenance News*, v. 8, Apr. 1955, p. 16-17.

Non-magnetic ores can be rendered magnetic and then concentrated by simple magnetic separation. Diagram.

Books and Miscellaneous Publications

9665 The Enrichment of Iron Ores. **L'enrichissement des minerais de fer.** (French.) L. Coche. 158 p. 1954. Centre D'Études Supérieures de la Sidérurgie. (TN520 C64e)

Survey of physical, chemical, and metallurgical processes in France and abroad.

PHYSICS

9666* Mean Temperature Differences in Cross Flow Heat Transfer. **Der mittlere Temperatursprung bei Querstrom-Wärmeübertragen.** (German.) A. F. Fritzsche. *Allgemeine Wärmetechnik; Zeitschrift für Wärme- und Kältetchnik*, v. 6, no. 1, 1955, p. 4-9.

Temperature distributions for various types of flow. Diagrams, graphs, table. 4 ref.

9667 Infrared Solar Spectrum. Leo Goldberg. *American Journal of Physics*, v. 23, Apr. 1955, p. 203-222.

Results of a study of the spectrum with modern grating spectrometers and detectors. Graphs, diagram, tables. 33 ref.

9668* Some Chemical Effects of Focused Ultrasound on Glutathione and Other Compounds. Richard E. Faust and Gustav E. Cwalina. *American Pharmaceutical Association, Journal, (Scientific Ed.)*, v. 64, Apr. 1955, p. 234-236.

Includes tables. 10 ref.

9669 Thermal Conductivity and Its Variability With Temperature and Pressure. Leon S. Kowalczyk. *American Society of Mechanical Engineers, Paper No.* 54—A-90, 1955, 33 p. (TJ1 Am35p)

Summary of the present status of the theory of thermal conductivity and attempts to explain its variability with temperature and pressure by means of the nature of heat, structure of matter, and resistances offered by matter to heat conduction at various physical states. Tables, graphs.

9670 Approximate Solution to Thermal Shock Problems in Plates, Hollow Spheres and Cylinders With Heat Transfer at Two Surfaces. A. Mendelson and S. S. Manson. *American Society of Mechanical Engineers, Paper No.* 54-A-264, 1955, 29 p. (TJ1 Am35p)

Mathematical analysis. Graphs. 7 ref.

9671* Some Applications of Piezoelectric Equations of State. **Einige Anwendungen der piezoelektrischen Zustandsgleichungen.** (German.) Rudolf Bechmann. *Archiv der elektrischen Übertragung*, v. 9, no. 3, Mar. 1955, p. 122-130.

Analysis of plates, piezoelectric behavior of plates, and thin bars. Tables. 6 ref.

9672* Visual Representation of Electromagnetic Waves. **Sichtbarmachung elektromagnetischer Wellen.** (German.) Hans Kleinwächter. *Archiv der elektrischen Übertragung*, v. 9, no. 3, Mar. 1955, p. 154-156.

Method of making visible the phase and amplitude distribution of the acoustic waves of an ultrasonic oscillator. Photographs. 3 ref.

9673* Emission Spectra in the Near Infra-Red. (English.) Bengt Kleman and Bengt Liljeqvist. *Arkiv för Fysik*, v. 9, no. 4, 1955, p. 377-383.

Small spectrometer with interchangeable grating and prism used for the study of various conventional light sources. Graphs, diagrams. 5 ref.

9674 Simple Method for Measuring Absorption of Ultrasonic Waves in Strongly Absorbing Solids. I. G. Mikhailov and V. A. Solov'ev. *Henry Brutcher Translation No.* 2904, 9 p. (From *Doklady Akademii Nauk SSSR*, v. 78, no. 2, 1951, p. 245-248.

Application of proposed method to study frequency dependence of absorption coefficient in viscous-elastic substances. Diagram, graph. 9 ref.

9675* Photoelectric Measurement of Weak Acoustical Birefrigences. **Mesure photoélectrique de faibles biréfringences acoustiques.** (French.) Jacques Badoz. *Comptes rendus*, v. 240, no. 10, Mar. 7, 1955, p. 1062-1064.

Describes system for measuring average optical path differences greater or equal to 10^{-4} λ. Graph. 6 ref.

9676* A Testing Device for the Study of Magnetic Fields. **Une sonde pour l'étude des champs magnétiques.** (French.) Raymond Birebent. *Comptes rendus*, v. 240, no. 10, Mar. 7, 1955, p. 1064-1065.

By using the action of a magnetic field on a current, a device was developed for measuring intensity of direct or alternating magnetic fields of strengths from a few to several thousand oersteds. Diagram.

9677* Action of Ni and Co on ZnS(Au) Phosphors. Displacement of the Fermi Level by Variation of the Concentration. **Action du nickel et du cobalt sur les phosphores ZnS(Au). Déplacement du niveau de Fermi par variation de la concentration.** (French.) Noubar Arpiarian. *Comptes rendus*, v. 240, no. 12, Mar. 21, 1955, p. 1333-1335.

Includes graphs. 3 ref.

9678 Extension of Fröhlich's General Theory of the Static Dielectric Constant to Dielectrically Anisotropic Materials. J. G. Powles. *Faraday Society, Transactions*, v. 51, Mar. 1955, p. 377-382.

Mathematical development. 14 ref.

9679* Proceedings of the Ninth All-Union Conference on Spectroscopy. **Materialy IX vsesoiuznogo soveshchaniia po spektroskopii.** (Russian.) *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia*, v. 18, no. 6, Nov.-Dec. 1954, p. 627-744.

Sixty-one papers covering spectral study of monoalkyl- and polymethylbenzenes; sensitization of photographic emulsions; effect of polymerization temperature on the structure of copolymers of butadiene with styrene; infra-red spectra and the tautometry of heterocyclical compounds; infra-red analysis of the micro-structure of rubbers.

9680 The Determination of Transient Temperatures and Heat Transfer at a Gas-Metal Interface Applied to a 40-mm Gun Barrel. W. H. Giedt. *Jet Propulsion*, v. 25, Apr. 1955, p. 158-162.

A method of measuring very rapidly changing temperature and heat transfer under the conditions of unidirectional heat flow in a semi-infinte solid. Diagrams, micrographs, oscillographs, graphs. 5 ref.

9681* Automatic (Photoelectric) Recording of the Components of the Superfine Structure of Spectral Lines. **Avtomaticheskaia (fotoelektricheskaia) registratsiia komponent sverkhtonkoi struktury spektral'nykh linii.** (Russian.) F. A. Korolev. *Moskovskogo Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk*, v. 10, no. 2, Feb. 1955, p. 61-67.

Describes methods of registration, based on the mechanical and optical manipulation of the spectrum. Diagram, graphs. 2 ref.

9682 Experimental Evidence for the Collective Nature of the Characteristic Electron-Energy Losss in Solids. D. Gabor and G. W. Jull. *Nature*, v. 175, Apr. 23, 1955, p. 718-720.

A new electrostatic spectrograph wherein the electrons describe a helical trajectory is used for 'line' spectra of electron energy losses in Au foil. Graph, micrographs. 5 ref.

9683 Raman Spectroscopy of Gases. H. L. Welsh, E. J. Stansbury, J. Romanko, and T. Feldman. *Optical Society of America, Journal*, v. 45, May 1955, p. 338-343.

An apparatus for photographing Raman spectra of low-pressure gases at high dispersion is described. Diagrams, graphs. 20 ref.

9684* Electroluminescent ZnS Phosphors. (English.) P. Zalm, G. Diemer, and H. A. Klasens. *Philips Research Reports*, v. 9, Apr. 1954, p. 81-108.

Preparation and properties. Diagrams, graphs. 22 ref.

9685* Photodiffusion Current Hall Effect: Transient Behavior. L. H. Hall. *Physical Review*, v. 97, ser. 2, Mar. 15, 1955, p. 1471-1474.

Treatment of the case of a semiconducting plate of infinite area and finite thickness, uniformly illuminated at one face by a beam normal to and absorbed at the surface. Graphs. 8 ref.

9686 Helium II Film Transport. I. The Role of Substrate. Bernard Smith and Henry A. Boorse. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 328-336.

Investigates the variation of transport rate with substrate material. Graphs, tables, diagrams. 39 ref.

9687 Interaction Between Spin Waves and Conduction Electrons in Ferromagnetic Metals. Elihu Abrahams. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 387-390.

Calculation of the relaxation processes which transfer energy from the ferromagnetic spin system to the lattice by way of conduction electrons. 17 ref.

9688 Magnetic Rotation Phenomena in a Polycrystalline Ferrite. II. David Park. *Physical Review*, v. 98, ser. 2, Apr. 15, 1955, p. 438-441.

Determination of the entire permeability tensor of a polycrystalline sample in which there exists a slight over-all magnetization. Graphs. 9 ref.

9689 Microwave Spectroscopy as Applied to Solids. D. M. S. Bagguley. *Research*, v. 8, Apr. 1955, p. 141-146.

Discussion of the techniques and results for measurements on solids. Diagrams, graph, table, photograph. 5 ref.

9690* The Scattering of a Scalar Wave by a Semi-Infinite Rod of Circular Cross Section. D. S. Jones. *Royal Society of London, Philosophical Transactions*, v. 247, ser. A, no. 934, Apr. 19, 1955, p. 499-528.

Includes graphs, tables. 16 ref.

9691 Finite Deformation of Materials Exhibiting Curvilinear Aeolotropy. J. E. Adkins. *Royal Society, Proceedings*, v. 229, ser. A, Apr. 5, 1955, p. 119-134.

Theory is formulated for materials which are completely unsymmetrical, orthotropic or transversely isotropic with respect to the curvilinear coordinate system which is employed to define the aeolotropy. 10 ref.

9692 Ill-Conditioned Matrices. Börje Langefors. *SAAB Aircraft Company, Technical Notes, SAAB TN* 22, 1953, 18 p. (TL504 Sv23t)

Errors occurring in the solutions of systems of equations as a consequence of limited accuracy in the coefficients are discussed. Diagrams. 9 ref.

9693* The *g-Factor of Ferromagnetic Spinels.* (English.) Yuzo Kojima. *Science Reports of the Research Institutes, Tôhoku University*, ser. A. v. 6, no. 6, Dec. 1954, p. 614-622.

Investigation of the differences in the *g*-factor of Ni-Zn and Mn-Zn ferrites. Graphs, table. 14 ref.

9694* The Phenomena of Photophoresis. **Die Erscheinungen der Photophorese.** (German.) O. Preining. *Staub*, 1955, no. 39, p. 45-64.

Study of gravito-, electro-, and magnetophotophoresis, various complex types, and the phenomenon resulting from various conditions. Diagrams, graphs, oscillograms. 23 ref.

9695 Differential Systems With Interface Conditions. Frank W. Stallard. *U. S. Atomic Energy Commission, ORNL-1876*, 1955, 71 p. (UF767 U3o)

May be studied by investigating an associated system without such conditions, where the matrices involved in each system have the same dimension. 37 ref.

9696 Standard X-Ray Diffraction Powder Patterns. Howard E. Swanson, Ruth K. Fuyat, and George M. Ugrinic. *U. S. National Bureau of Standards Circular* 539, v. 4, Mar. 1, 1955, 75 p. (T21 Un3c)

Forty-two standard X-ray diffraction powder patterns are presented in revision of the ASTM card file, a system for the identification of unknown crystalline materials based on the three strongest reflections of each material or structurally distinct phase. Tables. 229 ref.

Physics

9697* Problems of the Quantum Theory of Fields. **Voprosy kvantovoi teorii polia.** (Russian.) N. N. Bogoliubov and D. V. Shirkov. *Uspekhi Fizicheskikh Nauk*, v. 55, no. 2, Feb. 1955, p. 149-214.

Free wave fields; singular functions; interacting fields; Legrange interaction and S-matrix. 21 ref.

9698* Pole-Diople Particles in Gravitation Fields and in Electromagnetics Field. **Das Pol-Dipol-Teilchen im Gravitationsfeld und elektromagnetischen Feld.** (German.) A. Papapetrou and W. Urich. *Zeitschrift für Naturforschung*, v. 10a, no. 2, Feb. 1955, p. 109-117.

Equations of motion for pole-dipole particles under the influence of gravity and electromagnetic forces. 13 ref.

9699* Classic Non-Linear Lattice Statics of Disordered Crystal Structures. **Klassische nichtlineare Gitterstatik gestörter Kristallstrukturen.** (German.) E. Fues and H. Stumpf. *Zeitschrift für Naturforschung*, v. 10a, no. 2, Feb. 1955, p. 136-145.

Method for determination of the equilibrium state of lattice disturbed by shifting atoms. 11 ref.

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9700 Nomography and Empirical Equations. Dale S. Davis. 236 p. 1955. Reinhold Publishing Corp., New York. (QA90 D29n)

Correlation of two- and three-variable equations. Logarithmic and other nomographs.

9701 Some Basic Problems of the Mathematical Theory of Elasticity. N. I. Muskhelishvili. (Translated from the Russian by J. R. Radok.) 3rd Rev. Ed. 704 p. 1953. P. Noordhoff, Groningen-Holland. (QC191 M97s3t)

Fundamental equations, plane theory of elasticity, torsion, and bending.

9702 Mathematical Foundations of Quantum Mechanics. John Von Neumann. (Translated from the German by Robert T. Beyer.) Investigations in Physics Number 2. 445 p. 1955. Princeton University Press, Princeton, New Jersey. (QC174 V89m)

Principal emphasis is placed on the general and fundamental problems arising from the transformation theory.

9703 Molecular Vibrations. E. Bright Wilson, Jr., J. C. Decius, and Paul C. Cross. 388 p. 1955. McGraw-Hill, New York. (QC454 W69m)

The theory of the vibrations of polyatomic mol. and its applications to the interpretation of infra-red and Raman spectra.

See also:

8918 (Raman spectra of ammonia solutions)
9232 (study of the infra-red region)

PLASTICS

9704 Kinetics of the Polymerization of a Cyclic Dimethylsiloxane. W. T. Grubb and Robert C. Osthoff. *American Chemical Society, Journal*, v. 77, Mar. 20, 1955, p. 1405-1411.

Compounds polymerized by KOH from 120 to 160 C. Tables, graphs. 21 ref.

9705 Production of Polyvinyl Esters by Ester Interchange. E. W. Eckey, R. O. Alderson, and R. J. Woestman. *American Oil Chemists' Society, Journal*, v. 32, Apr. 1955, p. 185-191.

Hydrogenated sardine oil, soybean fatty acids, and cottonseed oil are tested as coating materials. Tables. 10 ref.

9706 Fatigue Testing of Nonrigid Plastics. R. H. Carey. *ASTM Bulletin*, 1955, no. 206, May, p. 52-54.

Fatigue life is shown to be primarily a function of applied stress. Photographs, diagrams, tables, graph.

9707 Centrifugal Casting of Polythene. *British Plastics*, v. 28, Apr. 1955, p. 126-129.

Development work in the manufacture of large-bore polythene tube. Photographs, diagram, micrographs, table.

9708* Reactivity of Acrylic Acid in Copolymerizations. **Réactivité de l'acide acrylique dans les copolymérisations.** (French.) Jacques Bourdais. *Bulletin de la société chimique de France*, 1955, no. 4, Apr., p. 485-489.

Study of copolymerization with acrylamide and with vinyl acetate. Tables, graphs. 8 ref.

9709 Polymers From the Oxides of Carbon. E. G. Curphey. *Chemical Age*, v. 72, Apr. 9, 1955, p. 845-846.

Reaction of CO and CO_2 with polyamines and ethylene at high pressures; use in fabric printing. 6 ref.

9710* Welding, a Suitable Method of Joining Thermoplastic Resins. **Die Schweissung, ein werkstoffgerechtes Verbindungsverfahren für thermoplastische Kunststoffe.** (German.) H. Peukert. *Chemiker-Zeitung*, v. 79, no. 7, Apr. 12, 1955, p. 210-213.

Four types of welding are adaptable. Photographs, diagrams, graph. 4 ref.

9711* Plasticizer for Cellulose Triacetate. **Weichmacher für Cellulosetriacetat.** (German.) K. Thinius. *Chemische Technik*, v. 7, no. 3, Mar. 1955, p. 147-158.

Investigation of a series of hydrocarbons indicated that caprolactam and phenyl-ethyl phenol compounds were the most desirable. Tables, diagrams. 50 ref.

9712 Polythene Twenty-One Years After Its Discovery. E. Hunter. *Chemistry & Industry*, 1955, no. 15, Apr. 9, p. 396-403.

Review of its discovery, development, applications, and some suggestions for further study. Table, graphs, micrographs. 24 ref.

9713 Plasticization of Polyvinyl Chloride With Alkyl Esters of Pinic Acid. R. F. Conyne and E. A. Yehle. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 853-855.

Dioctyl and octyldecyl esters of pinic acid are better secondary plasticizers than di-2-ethylhexyl phthalate. Tables. 4 ref.

9714 Polyvinylpridine Emulsifiers for Polymerization in Acidic Media. James E. Pritchard, Milton H. Opheim, and Patricia H. Moyer. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 863-866.

Emulsifiers perform in styrene, acrylonitrile, butadiene, vinyl chloride, vinyl acetate, and methyl acrylate polymerizations without degradation of quality. Tables. 13 ref.

9715 On the Helical Configuration of a Polymer Chain. Takehiko Shimanouchi and San-ichiro Mizushima. *Journal of Chemical Physics*, v. 23, Apr. 1955, p. 707-711.

Mathematical expression is based on bond lengths, bond angles, and internal rotation angles. Diagrams. 18 ref.

9716 Intrinsic Viscosity of Polymethylmethacrylate. Anton Peterlin. *Journal of Chemical Physics*, v. 23, Apr. 1955, p. 750-751.

Assigns non-linearity of mol. wt. in viscosity curves to branching in low mol. wt. polymers. Graphs. 7 ref.

9717* **Formation and Properties of Polymer Carbon.** F. H. Winslow, W. O. Baker, N. R. Pape, and W. Matreyek. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 101-120.

Treated and untreated pyrolytic derivatives of divinylbenzene-ethylvinylbenzene copolymer are examined. Tables, graphs, diagram, photographs, micrographs, X-ray diffractograms, infra-red spectra. 30 ref.

9718* A New Class of α-Olefin Polymers Having an Exceptional Regularity of Structure. **Une nouvelle classe de polymeres d'a-olefines ayant une régularité de structure exceptionnelle.** (French.) G. Natta. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 143-154.

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9719* Some Copolymerizations of *cis*- and *trans*-Dibenzoylethylene. C. S. Marvel and Arjeh B. Galun. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 251-259.
With butadiene, 2,3-dimethylbutadiene, and isoprene in emulsion systems. Tables. 10 ref.

9720* Ionic Polymerization. VI. The Mechanism of Molecular Termination by Aromatic Compounds in the Cationic Polymerization of Styrene. C. G. Overberger and Gerard F. Endres. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 283-298.
Uses chemical analysis and infra-red spectra in study of $SnCl_4$ catalyzed polymers. Tables, graphs. 23 ref.

9721* Kinetic Constants for Styrene Polymerization. A. V. Tobolsky and J. Offenbach. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 311-314.
Two constants, important for calculation of rates of initiation, are presented. Table, graphs. 4 ref.

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Shows reversibility in styrene-So_2 copolymerization. Graphs. 16 ref.

9723* The Melting Points of Chain Polymers. C. W. Bunn. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 323-343.
Melting points appear to be controlled by molar cohesion energy, mol. flexibility, and mol. shape effects. Tables, graphs. 27 ref.

9724* Preparation of Graft Copolymers From Autoxidized Polystyrene Derivatives. Donald J. Metz and Robert B. Mesrobian. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 345-355.
Polymeric hydroperoxide of partially isopropylated polystyrene is used. Tables, graphs. 14 ref.

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Here used for qualitative examination of several polymers. Diagrams, graphs. 13 ref.

9726* Emulsifier-Free Polymerization in Aqueous Media. G. S. Whitby, M. D. Gross, J. R. Miller, and A. J. Costanza. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 549-576.
Solution polymerization of water-soluble monomers with water-soluble redox initiators. Tables, graphs. 16 ref.

9727* Polyphenyl. Gerald A. Edwards and George Goldfinger. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 589-597.
Made by condensation of paradichlorobenzene using the Wurtz-Fittig reaction. Tables, graphs. 11 ref.

9728* Dielectric Behavior of Systems Consisting of Mixed High Polymers. **Dielektrisches Verhalten hochpolymerer Mischsysteme. I.** (German.) O. Broens and F. H. Müller. *Kolloid-Zeitschrift*, v. 140, nos. 2-3, Feb. 1955, p. 121-149.
Investigates the polyvinylacetate-diphenylmethane and benzylbenzoate-polystyrol systems. Diagrams, tables. 74 ref.

9729* Dielectric Behavior of High Polymer Mixed System. **Dielektrisches Verhalten hochpolymerer Mischsysteme. II.** (German.) O. Broens and F. H. Müller. *Kolloid-Zeitschrift*, v. 141, no. 1, Mar. 1955, p. 20-39.
Includes tables, graphs. 131 ref.

9730* The Position of the Polyacrylates Among Thermoplastics. **Die Stellung der Polyakrylate unter den Thermoplasten.** (German.) C. T. Kautter. *Kunststoffe*, v. 45, no. 4, Apr. 1955, p. 131-136.
Compares polyacrylates and methacrylates with other hard thermoplastics of similar processing characteristics, in order to reduce the selection difficulties of the processor and user. Graphs, photographs, tables. 2 ref.

9731 Is It a Job for Reinforced Plastics? Robert W. Matlock. *Materials & Methods*, v. 41, Apr. 1955, p. 138-139.
Table representing a quantitative method of determining whether reinforced plastics should be seriously considered for a new product.

9732* Plasticizers for Polyvinyl Chloride. **Weichmacher für Polyvinylchlorid.** (German.) R. Reichherzer. *Mitteilungen des chemischen Forschungsinstitutes der Wirtschaft Österreichs*, v. 9, no. 1, Feb. 1955, p. 6-9.
Method for selecting the most suitable plasticizer. Tables, nomograph. 10 ref.

9733 Electrical Parts by the Millions. *Modern Plastics*, v. 32, May 1955, p. 82 + 7 pages.
Expanded use of plastics, specialized materials, testing, and molding methods. Photographs.

9734 Color, Paint, and Plastics. Lloyd E. Parks. *Modern Plastics*, v. 32, May 1955, p. 99 + 10 pages.
Detailed consideration of formulations for spray and silk-screen application, and of finishes used on vacuum metallized surfaces. Diagrams, photographs.

9735 Hardness Testing of Plastics. Bryce Maxwell. *Modern Plastics*, v. 32, May 1955, p. 125 + 6 pages.
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9736* Forming and Finishing of the Corvette Plastic Body. Haviland F. Reves. *Organic Finishing*, v. 16, Apr. 1955, p. 9-13.
Step-by step process. Photographs.

9737* Vinyl Resins and the Oil Industry. *Petroleum Times*, v. 59, Apr. 15, 1955, p. 382, 385-386.
Application of flexible and rigid PVC. 2 ref.

9738 Resin Bonded Veneer Applications. *Plastics*, v. 20, Apr. 1955, p. 105-106.
Application and ease of forming are discussed. Photographs.

9739* Use of Silicones in the Plastics Industry. B. A. Thorsberg and L. F. Stebleton. *Plastics Technology*, v. 1, Apr. 1955, p. 145-149.
Utilization of resins, foams, release agents, adhesives, additives, and lubricants. Tables, graphs, photograph.

9740* Practical Aspects of Polyethylene Permeability and Chemical Resistance. Jules Pinsky. *Plastics Technology*, v. 1, Apr. 1955, p. 159-163.
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9741 Isocyanates. A. C. Stevenson. *Rubber Age*, v. 77, Apr. 1955, p. 63-68.
Commercial development and broad potential applicability in the fields of adhesives, foams, fluid polymers, and urethane rubbers. Tables, graphs, diagrams, photographs. 6 ref.

9742 PTFE Impregnated Self-Lubricating Bearing Materials. A. G. Thomson. *Rubber and Plastics Age*, v. 36, Apr. 1955, p. 207.
Methods of impregnation; yield stress.

9743 "Valron" Estersil Reinforcing Agent. *Rubber and Plastics Age*, v. 36, Apr. 1955, p. 209, 211.
Used as a reinforcing agent in silicone rubber, as well as in natural rubber, neoprene, GR-S, "Hypalon", and Butyl. Table. 1 ref. (To be continued.)

9744* Visco Mechanical Concept of Plastic Testing. Leroy A. Darling. *Sperry Engineering Review*, v. 8, Mar.-Apr. 1955, p. 13-18.
Attempt is made to present a phenomenological and a mol. interpretation of the mechanical behavior of plastics. Diagrams, graphs, photograph, table. 3 ref.

9745* Plastics in the Aircraft Industry. *Western Machinery and Steel World*, v. 46, Apr. 1955, p. 98-102.
Advantages and disadvantages. Photographs.

Plastics

9746* Demonstration of Elastic-Plastic Behavior of High Polymers. **Demonstrationen zum zähelastischen Verhalten hochpolymerer Stoffe.** (German.) Theodor Gast. *Zeitschrift für angewandte Physik*, v. 7, no. 2, Feb. 1955, p. 82-86.

Proposes a simple electromechanical device for determining the influence of temperature and time factors on the deformation processes. Photographs, circuit diagrams. 4 ref.

9747* Polymerization Kinetics of Isoprene in Aqueous Emulsifier Solutions and in Emulsions. **Issledovanie kinetiki polimerizatsii izoprena v vodnykh rastvorakh emul'gatora i emul'siiakh.** (Russian.) A. P. Sheinker and S. S. Medvedev. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 2, Feb. 1955, p. 250-262.

Data presented for bromide-N-cetyl pyridine solutions of various concentrations. Tables, graphs, diagram. 9 ref.

9748* Volumetric Effects in Ramified Polymer Chains. **Ob'emnye effekty v razvetvlennykh polimernykh tsepiakh.** (Russian.) O. B. Ptitsyn. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 2, Feb. 1955, p. 396-398.

Determination of the degree of mol. branching. Graph. 12 ref.

9749* Dynamic Double Refraction of Fractions of Polystyrol in Toluene and Butanone. **Dinamicheskie dvoinoe luchepreломlenie fraktsii polistirola v toluole i butanone.** (Russian.) E. V. Frisman and V. N. Tsvetkov. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 3, Mar. 1955, p. 447-457.

Determination of mol. wt., dimensions and shapes of macromolecules by refraction data. Diagrams, graphs, tables. 24 ref.

9750* Activation Energy and Temperature Dependency of Diffusion in Polymers. **Energiia aktivatsii i temperaturnaia zavisimost' diffuzii v polimerakh.** (Russian.) G. Ia. Ryskin. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 3, Mar. 1955, p. 458-465.

Diffusion parameters in vinyl polymers. Graphs, tables. 7 ref.

See also:

8672 (acrolein)
8734 (resinification of phenol alcohols)
8774 (polymerization of Si compounds)
8850 (plastics from polyamide)
9241 (dynamic properties of polymers)
9299 (plastic molding and hobbing)

POLLUTION AND WASTES

9751* **Photochemical Ozone Formation With Hydrocarbons and Automobile Exhaust.** A. J. Haagen-Smit and M. M. Fox. *Air Repair*, v. 4, Nov. 1954, p. 105-108, 136.

Method of determining the concentrations of nitrogen dioxide and hydrocarbon at which photochemical ozone formation occurs. Graphs, table. 8 ref.

9752* **Dust and Fumes From Gray Iron Cupolas—How They Are Controlled in Los Angeles County.** Hoyt R. Crabaugh, Andrew H. Rose, Jr., and Robert L. Chase. *Air Repair*, v. 4, Nov. 1954, p. 125-129; disc., p. 129-130.

Engineering evaluation necessary for the determination of proper types and designs of control equipment. Tables, photographs.

9753* **The Automatic Filter Paper Sampler in an Air Pollution Measurement Program.** Charles W. Gruber and Edwin L. Alpaugh. *Air Repair*, v. 4, Nov. 1954, p. 143-147; disc., p. 147-150, 171-172.

Instrument for evaluating the soiling effect of the suspended particulate fraction of air pollution. Map, tables, graphs. 3 ref.

9754* **The Collection of Silica Fume With a Venturi Scrubber.** J. E. Yocom and S. Chapman. *Air Repair*, v. 4, Nov. 1954, p. 155-158.

Studies show that silica fume can be collected at relatively high wt. efficiencies, but only at the expense of substantial quantities of power needed to create the pressure drop through the unit. Particle-size studies of inlet and outlet samples indicate that the relatively large particles were collected selectively with the greatest collection at the highest pressure drops. Cost estimates for a commercial venturi scrubber showed that the capital investment as compared with other collector types was low, while operating expenses were high and reflected the high power requirements. Micrographs, photograph, graphs, table. 10 ref.

9755* **The Magnitude of Errors in Stack Dust Sampling.** W. C. L. Hemeon and George F. Haines, Jr. *Air Repair*, v. 4, Nov. 1954, p. 159-164.

Results of studies on the magnitude of errors inherent in the conventional sampling procedures. Photographs, diagrams, tables, graphs. 8 ref.

9756* **Incinerator Design and the Fly-Ash Problem.** I. S. A. Greeley, S. M. Clarke, and R. H. Gould. *American City*, v. 70, May 1955, p. 102-103.

A detailed analysis of refuse as a "fuel" for the incinerator furnaces. Photographs, tables. (To be continued.)

9757* **The Effect of 2,4-Dinitrophenol on Activated Sludge.** Linvil G. Rich and Oscar W. Yates, Jr. *Applied Microbiology*, v. 3, Mar. 1955, p. 95-98.

Effect on sludge in concentrations varying from 4 to 35 p.p.m. Graphs, table. 7 ref.

9758* **Air Pollution in a Number of American Cities.** J. Cholak, L. J. Schafer, W. J. Younker, and D. Yeager. *Archives of Industrial Health*, v. 11, Apr. 1955, p. 280-289.

Determination of the concentrations of ozone (or "oxidant") in the atmosphere at ground level. Graphs, tables. 8 ref.

9759 **Stop Pollution by Nitrogen Oxides.** Max S. Peters. *Chemical Engineering*, v. 62, May 1955, p. 197-200.

Techniques and applications of control equipment. Table, graphs. 8 ref.

9760* **Nature, Distribution and Dispersion of Contaminants in the Urban Environment.** Morris Katz. *Engineering Journal*, v. 38, Apr. 1955, p. 426-433.

Includes tables, graphs. 14 ref.

9761* Utilization of Combustible Wastes. **L'Utilisation des déchets combustibles.** (French.) H. Guillon. *Flamme et thermique*, v. 8, no. 77, Feb. 1955, p. 17-19, 26-27.

Brief review of problems of using industrial waste products as fuels.

9762 **Dual Disposal System Fully Neutralizes Plating Wastes.** W. G. Patton. *Iron Age*, v. 175, May 5, 1955, p. 102-104.

Automatic waste disposal system in the automobile industry to destroy cyanide and neutralize acid-alkali waste. Photographs.

9763 **Air Pollution: Furnace Types and Sizes Dictate Most Effective Controls. I-II.** N. R. Shaffer and M. A. Brower. *Iron Age*, v. 175, Apr. 28, 1955, p. 100-102; May 5, 1955, p. 110-112.

Regulations, methods, equipment, and costs required for air pollution control in steel plants and foundries. Photographs, tables.

9764 **Do's and Don't in Plating Operations.** Charles Buehman. *Metal Finishing*, v. 53, Apr. 1955, p. 40-47, 55.

Use of ion exchange equipment for treating rinse water and plating wastes. Graphs, diagrams, tables, photographs. 18 ref.

9765* **Spraying Wipes Out Coal-Dust Troubles.** J. M. Chambliss. *Power*, v. 99, May 1955, p. 78-80, 202, 204.

Effective control of dust by spraying with water and a wetting agent. Photographs.

9766* **The Dissemination of Odors From Kraft Mill Smoke Stacks.** R. H. Wright. *Pulp and Paper Magazine of Canada*, v. 56, Apr. 1955, p. 131-134.

Recent developments; application of Sutton's theory. Graphs, table. 14 ref.

9767 **Reinforced Plastics. Tooling.** Fred Lyijynen. *Rubber and Plastics Age*, v. 36, Apr. 1955, p. 213-214.

Describes experimental work on plastic tooling with many new materials, some of which are very promising.

9768 Air Pollution. Frits W. Went. *Scientific American*, v. 192, May 1955, p. 62-70, 72.

Review of air pollution and its effects. Photographs, chart.

9769* Concentration of Activated Sludge by Centrifuge. Leland Bradney and R. E. Bragstad. *Sewage and Industrial Wastes*, v. 27, Apr. 1955, p. 404-409; disc., p. 410-414.

Includes diagrams, graphs, tables, flowsheet. 2 ref.

9770* The Importance of Differential Thermal Analysis in the Technical Investigation of Dusts. **Die Bedeutung der Differentialthermoanalyse für staubtechnische Untersuchungen.** (German.) J. A. Schedling. *Staub*, 1955, no. 39, p. 30-44.

Includes diagrams, graphs, table, photographs. 24 ref.

9771* Survey of Vacuum Filtration for Disposal of Sewage Sludge. James M. Morgan and James F. Thomson. *Water & Sewage Works*, v. 102, Apr. 1955, p. 135-142.

Includes diagrams, tables, photographs, graph. 17 ref.

9772* Recent Progress in Treatment of Refinery Waste Waters. Peter W. Sherwood. *Water and Water Engineering*, v. 59, Mar. 1955, p. 106-110.

An account of problems involved and methods adopted in dealing satisfactorily with waste waters. 6 ref.

Books and Miscellaneous Publications

9773 Tests for the Prevention of Silicosis. **Essai de prévention de la silicose.** (French.) L. Dautrebande, D. Cartry, J. Van Kerkom, and A. Cereghetti. 177 p. 1954. Union Minière du Haut-Katanga, Belgium. (RC774 D26e)

Methods, equipment, and test results on the agglutination of dusts, by saline aerosols, to increase size and prevent penetration into the lung regions.

9774 Standard Methods for the Examination of Water, Sewage, and Industrial Wastes. 10th Ed. 522 p. 1955. American Public Health Assn., New York. (TD380 Am35s10)

Physical and chemical, bacteriologic, and biologic examinations.

See also:

8590 (air pollution effect on plants)
8664 (absorption of nitrogen oxides)
8673 (dust collectors)
9597 (radioactive water pollutants)

RUBBER AND ELASTOMERS

9775 Silicone Rubber—"Perfect" Insulator. *Chemical and Engineering News*, v. 33, Apr. 25, 1955, p. 1806, 1808.

High temperature and corona resistant properties permit improved design. Photographs.

9776 Reflections on Rubber Research. G. Stafford Whitby. *Industrial and Engineering Chemistry*, v. 47, Apr. 1955, p. 806-820.

Highlights of author's 45 yr. of work in the rubber industry; reviews opportunities of modern research. Graphs, photographs. 55 ref.

9777* Reinforcing Effect of Condensation Polymers on Rubber in Connection With Their Particle Size. R. Houwink and J. van Alphen. *Journal of Polymer Science*, v. 16, Apr. 1955, p. 121-130.

Effect of enhanced if chemical bonds form. Table, graphs, diagrams, photograph, micrograph. 23 ref.

9778 Nature of Stark Rubber. Donald E. Roberts and Leo Mandelkern. *Journal of Research, National Bureau of Standards*, v. 54, Mar. 1955, p. 167-176.

Describes preparation of "stark rubber" and X-ray diffraction studies of it. Tables, graphs, X-ray diffractograms. 22 ref.

9779* Limits of Silicon Rubber Application in Comparison With Certain Heat-Resistant Organic Elastomers. **Die Einsatzgrenzen von Siliconkautschuk im Vergleich zur einigen wärmebeständigen organischen Elastomeren.** (German.) Julius Peter. *Kautschuk und Gummi*, v. 8, no. 3, Mar. 1955, p. 59WT-63WT.

Advantages and disadvantages; comparative physical and chemical properties. Tables, diagrams. 19 ref.

9780 The Morphology of a Sulfur-Vulcanizable Rubber-Silicone Polymer. Ernst A. Hauser. *Rubber Age*, v. 77, Apr. 1955, p. 73-76.

First such study of a sulfur-vulcanizing silicone polymer which can be combined with a natural or synthetic rubber. Micrographs. 5 ref.

9781 Natural Rubber for Service at Low Temperatures. W. P. Fletcher. *Rubber Developments*, v. 8, Spring 1955, p. 2-7.

Short and long term performance; torsion pendulum test; lower stiffening temperature; factors affecting crystallization; cross links and vulcanization. Photographs, tables, graph. 9 ref.

9782 Rubber in Mechanical Handling Equipment. II. Elevator Belts, Rubber Containers, Tyres for Industrial Trucks, Hose, Anti-Vibration Mountings. R. W. Parris. *Rubber Developments*, v. 8, Spring 1955, p. 10-15.

Includes photographs, table. 14 ref.

9783 Liquid Rubber. C. Speight. *Rubber Developments*, v. 8, Spring 1955, p. 18-24.

Advantages for industrial applications. Photographs. 2 ref.

9784* Ozone Crazing of Biaxially Stressed GR-S Vulcanizates. Z. T. Ossefort and W. J. Touhey. *Rubber World*, v. 132, Apr. 1955, p. 62-63, 70.

Ozone crazing shows same pattern as does photo-activated oxidation. Photographs. 2 ref.

9785* Carbon Black-Silica Mixtures in Tire Treads. Ralph F. Wolf. *Rubber World*, v. 132, Apr. 1955, p. 64-70.

Blends of Hi-Sil 202 and carbon black have favorable nonlinear properties, especially hand-tear resistance. Tables, photographs.

9786* Investigation of the Thermal Oxidation of Butadiene-Nitrile Rubbers. **Issledovanie termicheskogo okisleniia butadien-nitril'nykh kauchukov.** (Russian.) A. S. Kuz'minskii and E. B. Popova. *Zhurnal Prikladnoi Khimii*, v. 28, no. 3, Mar. 1955, p. 311-316.

Addition of O destruction and structural phenomena. Aging of vulcanizers. Conversion of nitrile-acrylic links. Graphs. 3 ref.

See also:

8733 (rubber analysis)
9743 (rubber fillers)
9822 (rubber-to-metal bonding)

SPACE HEATING AND CONDITIONING

9787 Central Heating by Heat Pump. *Engineering*, v. 179, Apr. 8, 1955, p. 439-441.

Report of three years operation indicates the pump helps to economize fuel by upgrading coal, and cites economic limits of operaton when taking low-grade heat from the air or ground. Diagrams, tables.

9788* Competitive Domestic Air Conditioner Uses Gas-Driven Compressor. William W. Clark. *Gas*, v. 31, Apr. 1955, p. 82-83.

Application of gas turbine compressors and an internal combustion compressor to home air conditioning. Diagrams, photograph.

9789 Air Conditioning Vital to Salk Polio Vaccine Process. Hugh F. Johnson. *Heating, Piping & Air Conditioning*, v. 27, May 1955, p. 116-117.

Highly filtered air for sterile production areas and closely controlled temperatures for the incubator and storage rooms, as

Space Heating and Conditioning

well as the air conditioned animal quarters and packaging building, are necessary for vaccine production. Photographs.

9790 Weather's Effect on Air Conditioning Load. John Everetts, Jr. *Heating, Piping & Air Conditioning*, v. 27, May 1955, p. 136-139.

Careful attention should be given to weather design factors, as well as internal heat gains, in the design of any system. Diagram, graphs, table.

9791* Trend of 1955 Window Air Conditioners. *Refrigerating Engineering*, v. 63, Apr. 1955, p. 60 + 3 plates.

Specifications and design.

9792* How Electrical Properties of Freon Compounds Affect Hermetic System's Insulation. B. J. Eiseman, Jr. *Refrigerating Engineering*, v. 63, Apr. 1955, p. 61-66, 133-136; disc., p. 137-139.

Influence of the Freon fluorinated hydrocarbon refrigerants on the electrical performance of the hermetic refrigeration system. Tables, diagrams, photographs. 3 ref.

9793* Personnel and Equipment Cooling in Supersonic Airplanes. J. Makowski and V. L. Whitney, Jr. *Shell Aviation News*, 1955, no. 200, Feb., p. 16-19.

Successful use of water vaporization permits the design of compact cooling units. Graphs, diagrams.

TEXTILES AND FIBERS

9794* A New Chemical for the Stabilization of Viscose Rayon. P. B. Stam. *American Dyestuff Reporter*, v. 44, Apr. 11, 1955, p. 251P-252P, 261P.

Acrolein-formaldehyde product has long range utility in the rayon-finishing field. 3 ref.

9795* Three-Dimensional Colored Styles on Cotton Produced With Resins. E. W. Lawrence and R. H. Phillips. *American Dyestuff Reporter*, v. 44, Apr. 11, 1955, p. 253P-255P.

Three-dimensional effects can easily be produced by impregnating cotton fabrics with thermosetting resins, partially drying and then emboss calendering, and subsequently curing. 1 ref.

9796* Desizing Procedures in Relation to Enzyme Evaluation. Hector C. Borghetty and John T. Taylor. *American Dyestuff Reporter*, v. 44, Apr. 11, 1955, p. 256P-261P.

Includes graph, tables.

9797* Static Electrification of Filaments: Experimental Techniques and Results. S. P. Hersh and D. J. Montgomery. *Textile Research Journal*, v. 25, Apr. 1955, p. 279-295.

Effects produced by the mechanics of rubbing, and effects produced by the nature of the materials rubbed. Diagrams, graphs, tables. 39 ref.

9798* Amino Acid Composition of Normal Wools, Wool Fractions, Mohair, Feather, and Feather Fractions. W. H. Ward, C. H. Binkley, and N. S. Snell. *Textile Research Journal*, v. 25, Apr. 1955, p. 314-325.

Includes tables. 41 ref.

9799* The Improvement of Luster of Cotton. XI. Dyes and Luster. Lyman Fourt, H. J. Elliott, and Pauline Streicher. *Textile Research Journal*, v. 25, Apr. 1955, p. 326-329.

Luster tends to increase with depth of shade or increasing absorption of light. Graphs. 4 ref.

Books and Miscellaneous Publications

9800 Review of Textile Progress. v. V. 588 p. 1953. The Textile Institute, Manchester, England; and The Society of Dyers and Colourists, Bradford, England. (TS14449 R32)

Fiber production, physics, and chemistry. Fabric production; coloring, finishing, and testing.

See also:

8796 (textile washing)
8799 (textile application of surfactants)

WELDING AND JOINING

9801 Hard Soldering. W. J. Smellie. *Aircraft Production*, v. 17, May 1955, p. 181-185.

Methods for joining Al by heating the suitably prepared surface and applying to it solder or brazing-alloy in the molten condition. Unlike welding, no fusion of parent Al is involved. Photographs, micrographs, tables, diagrams. 4 ref.

9802* Investigation of Adhesive-Bonding of Metals. **Untersuchungen und Studien zum Metallkleben.** (German.) G. Galiske. *Aluminium*, v. 31, no. 4, Apr. 1955, p. 151-156.

Data on the effect of degree of overlap, tensile strength of sheet, its thickness and surface condition, and width of test specimens on bonding strength; corrosion resistance, tensile and fatigue strength under stress cycling of the bonds; nature of the hardened adhesive. Graphs. 30 ref.

9803 Practical Control in the Welding of Alloy Steels. I. C. Fitch. *British Welding Journal*, v. 2, Apr. 1955, p. 151-158.

Methods of determining whether a steel is weldable, and shows how to establish the conditions necessary to weld it successfully. Graphs, table, diagrams, photographs. 14 ref.

9804 Oxy-Acetylene Pressure Welding of Aircraft Undercarriage Components. D. C. Brown and J. J. Wilson. *British Welding Journal*, v. 2, Apr. 1955, p. 160-171.

Preliminary experimental work leading to the production of a large pressure-welded undercarriage. Photographs, diagrams, tables, graphs. 2 ref.

9805 Bronze Welding of Steel. E. Ryalls. *British Welding Journal*, v. 2, Apr. 1955, p. 175.

Used to join a variety of similar and dissimilar ferrous and nonferrous metals at a temperature below that of the melting point of the parent metal. Diagrams.

9806 Measurement of Resistance-Welding Variables. J. E. Roberts. *British Welding Journal*, v. 2, Apr. 1955, p. 176-180.

Methods of measuring current, time, and electrode force. Diagram, photographs, circuit diagrams. 5 ref.

9807 On the Mechanism of Starting the Arc in Electric Welding. M. Ya. Broun and G. I. Pogodin-Alekseev. *Henry Brutcher Translation No.* 2892, 6 p. (From *Avtogennoe Delo*, v. 22, no. 8, 1951, p. 16-17.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 6997, v. 1, June 1952.

9808* Electric Projection Welding. **Soldadura electrica por protuberancias o resaltos.** (Spanish.) Evert H. Bylin. *Ciencia y técnica de la Soldadura*, v. 4, no. 21, Nov.-Dec. 1954, 13 p.

Study of factors and conditions that contribute to obtaining good practical results upon using above method of electric resistance welding; equipment used and possible applications. Diagrams, graphs.

9809* Problem of Cracking During the Arc Welding of Alloy Steels. **El problema de la fisuracion al soldar por arco los aceros aleados.** (Spanish.) F. Donis Ortiz. *Ciencia y técnica de la Soldadura*, v. 4, no. 21, Nov.-Dec. 1954, 10 p.

Study of metallographic structures, use of adequate electrodes, preparation of joints, preheating and heat treatments in examination of cracking in Ni and Mn steels. Graphs, micrograph.

9810* Contribution to the Problem of Non-Metallic Inclusions in Deposited Metal. **Contribucion al problema de las inclusiones no metalicas en el metal depositado.** (Spanish.) J. M. Sistiaga and W. Koch. *Ciencia y técnica de la Soldadura*, v. 4, no. 21, Nov.-Dec. 1954, 7 p.

Study of deoxidation processes in deposited metal in the electric arc welding of carbon steels. Chemical and morphological examination of non-metallic inclusions. Tables, diagram, graph, micrographs. 9 ref.

9811* Welding Aluminum. IV. Spot Welding. Charles Bruno. *Heating, Air Conditioning, Sheet Metal Contractor*, v. 46, Apr. 1955, p. 56-63.

Procedures which differ somewhat from conventional methods. Photographs, tables.

9812* **Are You Ready to Weld Titanium?** Orville T. Barnett. *Industry & Welding*, v. 28, May 1955, p. 63 + 6 pages.

Inert-gas metal-arc welding and resistance welding are described. Atmospheric contamination, joining techniques, and choice of inert atmosphere are discussed. Table.

9813 Mechanized Argon-Arc Welding. G. D. Chapman. *Light Metals*, v. 18, Apr. 1955, p. 115-121.

Analysis of current trends of production equipment selected to cover a broad range of welding operations in Al alloys. Tables, photographs, diagram. 6 ref.

9814 Wrought Carbon and Alloy Steel: Weldability. Helmut Thielsch. *Machine Design*, v. 27, May 1955, p. 166-172.

Evaluation of effects of variations in welding processes and materials. Recommended welding procedures. Photographs, tables.

9815 New Aluminum-Ceramic Bond Produces Hermetic Seal. George W. Hume. *Materials & Methods*, v. 41, Apr. 1955, p. 110-111.

A technique that produces a satisfactory high temperature seal between ceramic materials and Al and its alloys. Photographs, micrographs, table, diagram.

9816 Hard Soldering Aluminium. *Metal Industry*, v. 86, Apr. 15, 1955, p. 289.

Process for corrosion-resistant medium temperature work. Photographs.

9817* Fusion Welding of Malleable Aluminum Materials. **Das Schmelzschweissen von Aluminium-Knetwerkstoffen.** (German.) H. A. Horn. *Metall*, v. 9, nos. 7-8, Apr. 1955, p. 283-287.

Characteristics of the Al welding process; techniques and applications. Tables, diagrams, photographs. 4 ref.

9818* **Hidden-Arc Welding Improves Reel Design.** *Modern Machine Shop*, v. 27, May 1955, p. 124-127.

Design and fabricating angle employed in producing large dresser reels for the textile industry. Photographs.

9819* **What's Ahead for Titanium Fasteners.** James B. Duke. *Modern Metals*, v. 11, Apr. 1955, p. 46 + 3 pages.

Progress made in developing Ti aircraft locknuts. Problems remaining to be solved before the weight saving advantages of such parts can be realized at reasonable costs. Tables, photographs.

9820* Temperature of Transition of Brittleness, Criterion of Quality of Arc Welding Electrodes. **Température de transition de fragilite critère des qualité des électrodes de soudage à l'arc.** (French.) Daniel Séférian and Marcel Moneyron. *Revue de métallurgie*, v. 52, no. 3, Mar. 1955, p. 219-236; disc., p. 236.

Effect of electrode coatings upon transition temperature. Tables, graphs, micrographs, diagrams. 17 ref.

9821* Examination of Some Problems Raised by the Arc Welding of Large Soft Steel and Alloy Steel Pieces in the Construction of Modern Machines. **Examen de quelques problèmes posés par le soudage à l'arc de pièces massives en acier doux et en acier alliés dans la construction de machines modernes.** (French.) A. Lűthy. *Revue de la soudure (Brussels)*, v. 11, no. 1, 1955, p. 1-15.

Preparation and assembling of pieces before welding; heat treatments before, during, and after welding; electrodes; control of welded heads. Photographs, micrographs.

9822* **Recent Developments in Rubber-to-Metal Bonding.** Howard H. Irvin and William H. Cornell. *Rubber World*, v. 132, Apr. 1955, p. 55-61.

A new system, effective in bonding the most widely used elastomers, is insensitive to disturbing variations in atmospheric conditions, and is effective for bonding at high temperatures with short curing cycles. Tables, diagram, graphs, photographs.

9823* Contribution to the Formation of Titanium-Nitrides in Welds of Rutile Type Coated Electrodes. **Beitrag zur Bildung von Titannitriden in den Schweissen rutilsauer umhüllter Elektroden.** (German.) W. Hummitzsch and L. Hense. *Schweissen und Schneiden*, v. 7, no. 3, Mar. 1955, p. 79-85.

Improving influence of special nitrides on quality of welds. Tables, graphs. 6 ref.

9824* Examples of Application of the Silox Soldering Process. **Anwendungsbeispiele des Silox-Lötverfahrens.** (German.) Benno Sixt. *Schweisstechnik*, v. 9, no. 2, Feb. 1955, p. 17-20.

Methods and advantages of soldering gray iron castings. Photographs.

9825* Welding of High-Strength Cast Iron Containing Spheroidal Graphite. **Svarka vysokoprochnogo chuguna s sharovidnym grafitom.** (Russian.) V. V. Bazhenov, L. M. Iarovinskii, and A. D. Kuznetsova. *Svarochnoe Proizvodstvo*, 1955, no. 3, Mar., p. 1-5.

Variation of cast iron hardness with quenching at different temperatures; mechanical propetries of welded seams and their micro-structure when Fe-Ni and other electrodes are used; effect of heat treatment. Graph, tables, micrographs. 5 ref.

9826* Welding of Pipes Consisting of Two Layers, One of Which Is Rust-Proof. **Svarka dvukhsloinykh trub s nerzhaveiushchim sloem.** (Russian.) N. Iu. Pal'chuk. *Svarochnoe Proizvodstvo*, 1955, no. 3, Mar., p. 5-7.

Problems involved and the types of welding recommended. Tables, photographs, micrographs, diagram. 2 ref.

9827* Welding of Pipes of Heat-Resistant Chromium- Molybdenum Steel 12 X 5MA. **Svarka trub iz teploustoichivoi khromomolibdenovoi stali 12 X 5MA.** (Russian.) L. S. Livshits, A. G. Mazel', M. Ia. Chushenkova, and L. P. Bakhrakh. *Svarochnoe Proizvodstvo*, 1955, no. 3, Mar., p. 8-10.

Types of electrodes used; condition and pre-treatment of welded parts; micro-structure of welded zone. Micrographs, tables.

9828* Experiment in the Automatic Welding of Two-Layer Steel Vessels. **Opyt avtomaticheskoi svarki sosudov iz dvukhsloinoi stali.** (Russian.) F. S. Bugrii. *Svarochnoe Proizvodstvo*, 1955, no. 3, Mar., p. 16-18.

Techniques for fusing the rust-resistant steel seam into the low-carbon steel. Photographs, diagrams, micrographs. 2 ref.

9829* Electric Arc Welding of Lead and Aluminum Bronzes and of Siliceous Brass. **Elektrodugovaia svarka olovianistykh i aliuminievykh bronz i kremnistoi latuni.** (Russian.) I. P. Doronin and V. M. Sventitskii. *Svarochnoe Proizvodstvo*, 1955, no. 3, Mar., p. 18-21.

Types of electrodes; weld thicknesses; conditions; chemical composition of bronzes and brasses; micro-structure. Micrograph, photographs, tables. 3 ref.

9830* **Projection Welding.** Ralph H. Eshelman. *Tool Engineer*, v. 34, May 1955, p. 109-118.

Discusses the adaptability of automatic assembly to production and other applications. Photographs, diagrams, tables.

9831 Old Gas—New Application. T. B. Jefferson. *Welding Engineer*, v. 40, May 1955, p. 36-38.

With the addition of carbon dioxide, the Mig welding process now employs three inert gases. But because CO_2 is so much cheaper, it may soon overtake A and He in the popularity race. Table, photographs, graphs.

9832 Low-Heat Welding of Cast Iron. Arthur L. Phillips. *Welding Engineer*, v. 40, May 1955, p. 47-48, 57.

Quickest, and most economical, and satisfactory method of joining or repairing castings. Photographs.

9833 The Heat-Affected Zone in Arc-Welded Type 347 Stainless Steel. E. F. Nippes, H. Wawrousek, and W. L. Fleischmann. *Welding Journal*, v. 34, Apr. 1955, p. 169S-179S.

An investigation to establish the properties of Type 347 in regions adjacent to arc welds to determine the effect of these properties upon the behavior of weldments at elevated temperatures. Photographs, tables, oscillogram, graphs, diagram, micrographs. 17 ref.

Welding and Joining

9834 Welding Procedure Qualification Tests for Six High-Yield-Strength Steels. A. P. Bunk. *Welding Journal*, v. 34, Apr. 1955, p. 197S-206S.

Qualification procedure tests to establish suitable welding procedures for six high-strength pressure-vessel steels. Diagrams, tables, photographs. 2 ref.

9835 Recent Developments on Contact Electrodes. D. L. Mathias. *Welding Journal*, v. 34, Apr. 1955, p. 316-328.

Characteristics of the contact electrode offer possibilities for cost reduction through increased deposition rate, reduced cleaning costs, and greater welder appeal. Photograph, tables, diagrams, graphs. 3 ref.

9836 Automatic Arc Welding. J. A. Lucey. *Welding and Metal Fabrication*, v. 23, Apr. 1955, p. 116-121.

Advantages and its field of application. Photographs, tables.

9837 Automatic Sigma Welding. D. B. Tait. *Welding and Metal Fabrication*, v. 23, Apr. 1955, p. 127-129.

Weld is protected from atmospheric oxidation by a shield of inert gas. Photographs, graph.

9838* Modern Metal Joining Using Glue and Its Strength. **Über neuzeitliche Metallklebverbindungen und ihre Festigkeit.** (German.) E. W. Pleines. *Zeitschrift für Metallkunde*, v. 46, no. 3, Mar. 1955, p. 160-171.

Technique of operation and importance of the method, particulary for light alloys. Drawings, tables, stress pattern, photographs. 11 ref.

9839* Current Brazing Problems. **Aktuelle Problems des Lötens.** (German and French.) Jakob Colbus. *Zeitschrift für Schweisstechnik*, v. 45, no. 2, Feb. 1955, p. 27-35.

Review of brazing research in Switzerland. Diagrams, micrographs, graphs, table. 8 ref.

Books and Miscellaneous Publications

9840 Materials and Welding. **Werkstoff und Schweissung.** Handbook on Materials and Techniques of Welding. **Handbuch für die Werkstoff-und Werkstoffbedingte Verfahrenstechnik der Schweissung.** (German.) Friedrich Erdmann-Jesnitzer, editor. v. II. 617 p. 1954. Akademie-Verlag, Berlin. (TS227 Er28w)

Welding methods for ferrous and non-ferrous metals, and alloys; post-welding heat treatment; testing procedures; structure and property changes.

See also:

9642 (health hazards in welding)
9710 (welding thermoplastics)

WOOD AND FOREST PRODUCTS

9841* **Fungus Proofing of Paper and Paperboard.** Henry C. Crandall. *Applied Microbiology*, v. 3, Mar. 1955, p. 89-94.

Includes diagram, photographs. 7 ref.

9842* **Automatic Control of Machine Hood Exhaust Air Characterized to Suit Outdoor Temperatures.** L. F. Giauque. *Pulp and Paper Magazine of Canada*, v. 56, Apr. 1955, p. 107-112.

Includes graphs, tables, diagrams.

9843* **Description of the Ventilating Equipment on a Six-Hundred Ton Kraft Machine.** E. S. Rice. *Pulp and Paper Magazine of Canada*, v. 56, Apr. 1955, p. 113-116.

Observations to date have proved the installation to be trouble free from both the control and mechanical points of view. Photographs.

9844* **The Oxidation of Spruce Periodate Lignin With Sodium Chlorite and With Chlorine Dioxide.** N. Levitin, N. S. Thompson, and C. B. Purves. *Pulp and Paper Magazine of Canada*, v. 56, Apr. 1955, p. 117-130.

Includes graphs, tables, diagram. 59 ref.

See also:

8953 (finishing wood turnings)
9766 (air pollutants from papermills)